

THE TREATMENT OF INFANTS  
AND PRESCHOOL CHILDREN  
WITH SLEEP DISTURBANCE

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## ABSTRACT

Sleep disturbance in infants and young children has been treated using three strategies: psychotherapy, medication, and behavior modification. Three experiments were undertaken to treat sleep disturbance with infants and preschool children. In the first study, the effects of extinction was evaluated with 13 infants aged 6 to 18 months. In the second study, the effects of extinction plus reinforcement procedures were evaluated with 22 preschool children aged 2 to 5 years, and in the final study, the effects of reinforcement only was evaluated with 22 preschool children. A multiple baseline across subjects design was used in each experiment. Six dependent variables were monitored, including bedtime delay, sleep onset latency, night-waking, duration of each waking, parental attention, and the duration of sleep across a 24-hour-day. Parents recorded data during baseline, treatment, maintenance, and 18 month followup. Results showed 91% of infants (10/11) maintained treatment gains in the first study, 18 months after the termination of treatment. In the second study, 95% of preschool children (21/22) on the extinction plus reinforcement contingency maintained treatment gains at 18 month followup. Finally, 90% of preschool children (19/21) on the reinforcement contingency alone maintained treatment gains at 18 month followup. These studies demonstrate the efficacy of behavioral procedures in the treatment of sleep disturbance in infants and children.

## LITERATURE REVIEW

### SLEEP DISTURBANCE IN YOUNG CHILDREN

Sleep disturbance has been defined as "a class of problem behaviors and complaints associated with sleep" (Coates & Thoresen, 1981, p 690). These behaviors include one or more of the following: failure to sleep during the night (night-waking); initial difficulty in falling asleep (sleep onset latency); bedtime refusal and resistance (bedtime delay); and sleeping in an inappropriate location (usually the parental bed). While sleep disturbance is not as perplexing as other sleep disorders listed in the DSM III, axis I (e.g., night terrors - sleep terror disorder, repeated episodes of abrupt awakening with a panicky scream, or sleepwalking disorder - repeated episodes of arising from bed during sleep and walking about). Sleep disturbance problems can be just as troublesome for parents. In addition, they are more common than other sleep disorders and therefore put more families under pressure. In young children, 33% - 50% experience sleep disturbance problems, whereas less than 4% - 6% experience night terrors and less than 15% experience sleepwalking disorder (Anders & Weinstein 1972; Beltramini & Hertzog 1983; Carlson, White & Turkat 1982; Simmonds & Parraga 1982).



## PREVALENCE

A number of studies have reported the prevalence of night-wakings. Table 1 presents a summary of studies of night-waking in 6 to 24-month-old children. These studies show an increase in night-waking as children approach 24 months of age. The American studies (Beltramini & Hertzog 1983; Chamberlin 1974; Ragins & Schacter 1971) report a higher prevalence of night-waking than the New Zealand study (Fergusson, Shannon, & Horwood 1982) or the British studies in Table 1 (Bax & Hart 1976; Bernal 1973; Jenkins, Bax, & Hart 1980; Jenkins, Owen, Bax, & Hart 1984; Moore & Ucko 1957). Only four of the ten studies in Table 1 present data across the age range of 6 to 24-month-old children. Comparison between the studies in Table 1 is hampered by small sample sizes, missing data within some age ranges and different criteria of duration and number of wakings used to define a night-waking episode.

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Insert Table 1 about here  
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A number of studies have reported the prevalence of sleep onset latency (initial difficulty in falling asleep) and bedtime delay (bedtime refusal or resistance). Table 2 presents a summary of these studies in 6 to 24-month-old

Table 1

The prevalence of night-waking in children aged 6 to 24-months

Study	Age Range		
	6 - 12 months	12 - 18 months	19 - 24 months
Bax & Hart (1976)	-	-	18% <sup>a</sup> (64)
Beltramini, & Hertzog (1983)	14% (109)	26% (109)	42% (109)
Bernal (1973)	-	-	31% (77)
Carey (1975)	-	25% (60)	-
Chamberlin (1974)	-	52% (100)	52% (100)
Fergusson et al (1982)	16% (1156)	27.8% (1156)	35.4% (1156)
Jenkins, Bax, & Hart (1980)	18% (32)	26% (31)	30% (33)
Jenkins, Owen, Bax, & Hart (1984)	19% (331)	27% (276)	26% (249)
Moore & Ucko (1957)	17% (104)	-	-
Ragins & Schachter (1971)	-	55% (104)	-

<sup>a</sup> The number in brackets is the size of the population sampled.

children. Only two studies (Jenkins et al 1984; Roberts & Schoellkopf 1951) have a large enough sample for a survey of an infant population. The criteria used to define sleep onset latency or bedtime delay problems are not often given. The amount of variation between child sleep onset latency and bedtime delay was demonstrated by Shinn (1932). The observation of 166 children aged 1 to 6 years showed daytime sleep onset latency and bedtime delay of 15 to 45 minutes and before nighttime sleep of 5 to 75 minutes (Shinn 1932).

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Insert Table 2 about here  
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Comparisons between age ranges in Table 2 should take account of the fact that there are fewer studies than Table 1, small sample sizes, missing data within age ranges and different criteria of what constitutes a sleep onset latency or bedtime delay problem. These studies show about one in six 6 to 24-month-old children experience sleep onset latency and bedtime delay. The studies in Table 2 also show an increase in bedtime delay and sleep onset latency as children approach 2 years of age; this being similar to the rise in night-waking in Table 1. However, incomplete survey data of the 0 to 6-month age range in Tables 1 and 2 means that increases in night-waking, sleep onset latency and bedtime delay cannot be fully ascertained until the 0 to 6-month age range has been

Table 2

The prevalence of sleep onset latency and bedtime delay in

children aged 6 to 24-months

Study	Age Range		
	6 - 12 months	12 - 18 months	19 - 24 months
Bax & Hart (1976)	-	10% (64)	13% (140) <sup>a</sup>
Basler, Largo, & Molinari (1980)	-	13% (320)	-
Beltramini, & Hertzog (1983)	-	6% (109)	12% (109)
Jenkins, Bax, & Hart (1980)	33% (33)	12% (33)	-
Jenkins, Owen, Bax, & Hart (1984)	13% (333)	17% (277)	15% (250)
Ragins & Schacter (1971)	-	-	30% (48)
Roberts & Schoellkopf (1951)	-	14.5% (783)	-

<sup>a</sup> The number in brackets is the size of the population sampled.

sampled more fully.

A number of studies have reported the prevalence of night-waking in 24 to 60-month-old children. Table 3 presents a summary of these results. These studies show that about 20% - 60% of 24 to 60-month-old children experience night-waking. Only five of the 11 studies presented data across the 24 to 60 month age range (Beltramini & Hertzog 1983; Chamberlin 1974; Jenkins et al 1980; Jenkins et al 1984; Seiler 1972). Two American prospective studies (Beltramini & Hertzog 1983; Chamberlin 1974) reported a higher prevalence of night-waking than other studies in Table 3. The British studies (Jenkins et al 1980; Jenkins et al 1984; Seiler 1972) reported a decline in night-waking in 24 to 60-month-old children.

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Insert Table 3 about here  
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A number of studies have reported sleep onset latency (i.e., initial difficulty in falling asleep) and bedtime delay (i.e., bedtime refusal or resistance) in 24 to 60-month-old children. Table 4 presents a summary of these studies. Again many of these studies are weakened by small sample sizes. Only three studies of sleep onset latency and bedtime delay surveyed moderate size samples of a preschool population (Jenkins et al (1984; Richman et al 1975; Roberts & Schoellkopf 1951). The studies in Table 4 show about one in

Table 3

The prevalence of night-waking in children aged 2 to 5 years

Study	Age Range		
	24 - 36 months	37 - 48 months	49 - 60 months
Basler, Largo, & Molinare (1980)	-----	40 - 50% (320) <sup>a</sup>	-----
Bax & Hart (1976)	17% (140)	-	-
Beltramini & Hertzog (1983)	57% (62)	66% (72)	65% (71)
Chamberlin (1974)	52% (100)	52% (100)	56% (100)
Jenkins, Bax, & Hart (1980)	7% (40)	26% (73)	10% (59)
Jenkins, Owen, Bax, & Hart (1984)	21% (306)	21% (331)	16% (272)
Ragins & Schachter (1971)	10% (48)	-	-
Richman (1981)	20% (771)	-	-
Richman, Stevenson, & Graham (1975)	33% (765)	-	-
Roberts & Schoellkopf (1951)	33% (777)	-	-
Seiler (1972)	28% (56)	25% (52)	7% (56)
Schach & Starfield (1973)	0 - 4 yrs 27% (362)	5 - 9 yrs 13% (186)	10 - 14 yrs 7% (109)

<sup>a</sup> The number in brackets is the size of the population sampled.

six 24 to 60-month-old children experience sleep onset latency and bedtime delay. Again the two American prospective studies of Beltramini and Hertzog (1983) and Chamberlin (1974) report a higher incidence of sleep onset latency and bedtime delay than is reported for British preschool populations (Jenkins et al 1980; Jenkins et al 1984; Richman et al 1975).

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Insert Table 4 about here  
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A prospective study by Jenkins et al (1984) investigated the persistence of night-waking in 150 children, aged 6 months to 4 1/2 years, using a criterion of at least four nights awake per week. Jenkins et al (1984) found the following:

"from 6 months to 1 year the probability of continuing to wake at night was fairly high; 44% of the 6-month wakers were still waking at 1 year. Of the children not waking at 6 months, 16% developed a night-waking problem between 6 months and 1 year. Of the night-waking babies at 1 year, 41% were still waking on 4 or more nights at 18 months; from 18 months to 2 years 54% of the wakers continued waking. This pattern is similar at all ages, with 80 - 90% of non-wakers continuing as non-wakers, but a small proportion of children at each age developing a night-waking

Table 4

The prevalence of sleep onset latency and bedtime delay

in children aged 2 to 5 years

Study	Age Range		
	24 - 36 months	37 - 48 months	48 - 60 months
Basler, Largo, & Molinari (1980)		16% (320) <sup>a</sup>	
Beltramini & Hertzog (1983)	61% (47)	75% (67)	66% (72)
Chamberlin (1974)	70% (100)	46% (100)	56% (100)
Jenkins, Bax, & Hart (1980)	12% (40)	15% (73)	12% (59)
Jenkins, Owen, Bax, & Hart (1984)	18% (303)	18% (331)	16% (274)
Ragins & Schachter (1971)	15% (48)	-	-
Richman, Stevenson, & Graham (1975)	-	12.5% (657)	-
Roberts & Schoellkopf (1951)	14.5% (783)	-	-
Salzarulo & Chevalier (1983)	2 - 5 yrs 16.5% (84)	6 - 10yrs 28.5% (97)	11 yrs 21.5% (37)

<sup>a</sup> The number in brackets is the size of the sample.



problem which was not present at the previous age. In children over 2 years of age there was much less persistence of night-waking. Seventy-five percent of 2-year-old wakers were not waking at 3 years, and 86% of 3-year-old wakers were not waking at 4 1/2 years" (p. 81).

Jenkins et al (1984) also found that 5% of 6 to 24-month-old children remained chronic night-wakers. Richman (1981b) reported 10% of 1 to 2-year-old children had been chronic night-wakers from birth. Fergusson et al (1982) reported 10% ( N = 1156 ) of 6 to 24-month-old children had been chronic night-wakers from birth.

Much less attention has been paid to sleep disturbance in handicapped or developmentally disabled persons. Sleep disturbance rates tend to be as high in handicapped children as in other children (Howlin 1984) but their sleep problems appear not to decline with age (DeMyer 1979). A study of sleep disturbance in autistic children aged between five and six years reported all 33 children had night-waking problems (DeMyer 1979). Forty-nine percent of these children had severe sleep disturbance (four or more night-wakings per week), and 97% had sleep onset latency or bedtime delay.

In summary, Tables 1 and 2 indicate an increase in night-waking, sleep onset latency, and bedtime delay in 6 to 24-month-old children. Tables 3 and 4 show a decline in night-waking, sleep onset latency, and bedtime delay in 24 to

60-month-old children. Comparison of night-waking, sleep onset latency, and bedtime delay in Tables 1 to 4 are limited by small sample sizes, missing data across age ranges, few longitudinal studies, and the lack of survey data from the 0 to 6 month age range. Different criteria used to define how many minutes and how many wakings constitute a night-waking, bedtime delay or sleep onset latency problem also limits comparisons between the studies. Richman (1984) goes so far as to suggest that the similarity in prevalence figures may be spurious because of the above methodological shortcomings. A study of the persistence of night-waking in 6 to 54-month-old children suggested that 5% - 10% of children may be chronic wakers for 4 years or more (Fergusson et al 1982; Jenkins et al 1984; Richman 1981b).

#### ETIOLOGICAL CONSIDERATIONS

The etiology of sleep disturbance has drawn the attention of sleep researchers for over three decades. Yet the literature remains unclear as to what factors cause night-waking, sleep onset latency, bedtime delay, and going to sleep in an inappropriate location (i.e., the parental bed). Studies that have addressed etiological factors have rarely used direct observation or reported reliability data on their observations. Often the sample sizes under investigation are too small or only just large enough to meet statistical requirements. While some have used interviews, the use of

questionnaires has been the most common method of investigation.

The literature considering the etiology of sleep disturbance can be broadly subdivided into those studies which address constitutional factors and those examining environmental factors.

#### Constitutional Factors

Sleep researchers have considered many causal factors of sleep disturbance including: familial and hereditary influences, intelligence quotient, infant temperament, gender differences, colic (in infants), the amount of day-sleep, the time of a child's first cry, teething, the season of birth, birth weight, premature birth, and birth order. Table 5 presents a summary of studies which have addressed these constitutional factors.

In a study of possible familial factors, Abe and Shimakawa (1966) reported parents who slept lightly during their childhood had offspring who manifested the same tendency. But, as the authors rightly suggest, memories 20 to 30 years later makes reliability of these self reports questionable.

Several studies have investigated sex differences in children with sleep disturbance. These studies have not reported any sex difference in infants, preschool children or adolescents (Bernal 1973; Scott 1931; Seiler 1972; Simmonds &

Parraga 1982). Only one investigation (Moore & Ucko, 1957) found any sex differences; it was found that from a sample of 104 infants in their first year, boys woke significantly more often than girls.

The role of crying as a constitutional factor of sleep disturbance was studied by Bernal (1973). In a sample of 77 neonates, Bernal found that the 21 wakeful babies took longer to emit their first-ever cry than the rest of the sample.

The predisposition to waking in infants with colic has been blamed for night-waking. However, Moore and Ucko (1957) did not find any association between colic and night-waking in 104 infants. When there is no apparent reason for night-waking, teething has also been blamed (Illingworth 1968; 1972b). After following 104 infants with teething problems for 12 months, Moore and Ucko (1957) reported no association between teething in waking and non-waking infants in terms of when they cut their first teeth.

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Insert Table 5 about here  
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A common belief is that the wakeful child is more intelligent (Battle 1970; Douglas & Richman 1984; Illingworth 1968; 1972b; Richman 1981a). In a study of 59 three-year-old first-born middle class children, it was found night-waking was not associated with scores on I.Q. tests, language

Table 5

Studies of constitutional factors of sleep disturbance in  
infants and young children

Causal factor	Subjects	Outcome measures	Study outcome
-----			
GENETIC			
+ Abe & Shimakawa (1966)	665	questionnaire of parents & child	Some tendency found offspring had some waking problems
SEX DIFFERENCES			
- Bernal (1973)	77 0 - 14 months	interviews & diary records	21 sleep problem and 56 control group children showed no sex differences
+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Boys woke more than girls in 1 year $p < .01$
- Seiler (1972)	234 6 - 60 months	questionnaire	57 boys and 37 girls: no gender difference with sleep problems
- Simmonds & Parraga (1982)	369 1 - 12th grade	questionnaires	No relationship between sleep behavior and gender
TIME OF 1ST CRY			
+ Bernal (1973)	77 0 - 14 months	interviews & diary records	Time to first cry was longer in the 21 sleep problem children than the 56 other infants $p < .05$
COLIC			
- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Colic was not identified as a cause of regular waking during the night

## TEETHING

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	No significant differences in age of settling were found between infants who cut their teeth before 6 months, between 6 and 9 months, and after 9 months of age
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## INTELLIGENCE QUOTIENT

- Blurton-Jones et al (1978)	59 15 - 39 months	interview & observations	Night-waking was not associated with scores in I.Q., of first-born middle class children
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## LANGUAGE DEVELOPMENT

- Blurton-Jones et al (1978)	59 15 - 39 months	interview & observations	Night-waking was not associated with scores in language development tests of first-born middle class children
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## TEMPERAMENT

+ Carey (1974)	60 6 - 12 months	questionnaire	At 6 months 13 of 15 infants with night- waking had low sensory threshold $X^2(1, N = 60)$ $= 6.0, p < .02$
+ Carey (1975)	144 6 - 12 months	questionnaire	Continuation of 1974 study; 1977 population $N = 144$ infants with night-waking had low sensory threshold $X^2(1, N = 144) = 16.3,$ $p < .01$
- Carey (1974)	60 6 - 12 months	questionnaire	At 6 months mothers rated nine temperament categories; all except low sensory-threshold were not related to sleep behavior
- Carey (1975)	144 6 - 12 months	questionnaire	Continuation of 1974 study $N = 144$ , all except low sensory threshold were not related to sleep behavior

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Rating the childrens' during each visit to the clinic, on a five point scale; activity, of crying intensity excitability, and cheerfulness showed no link to age of settling or waking score
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#### PERINATAL AND OBSTETRIC FACTORS

+ Blurton-Jones et al (1978)	59 15 - 39 months	interview & observations	Both influenced responses to crying and night-waking
- Chavin & Tinson (1980)	124 8 - 36 months	experimental & control groups questionnaires	No correlation between birth history and & subsequent sleep patterns
- Anders & Hoffman (1973)	34 newborn	experimental sleep polygram	Birth weight criteria could not differentiate between full-term and premature infants
+ Anders & Hoffman (1973)	34 newborn	experimental sleep polygram	More mature sleep states in full-term infants compared to premature infants, after 44th weeks conception age
- Chavin & Tinson (1980)	124 8 - 36 months	questionnaire	Low birth weight, no significant between sleep problem and control groups
- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Neither birth weight, nor weight of infant at 3 months showed any relationship with age of settling or waking score
+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Asphyxia at birth had tendency to more wakefulness $p \leq .05$
+ Bernal (1973)	77 0 - 14 months	interviews & diary records	Length of labour significant in sleep problem group $p \leq .02$

+ Bernal (1973)	77 0 - 14 months	interviews & diary records	Scale similar to apgar score lower in sleep problem group $p = <.05$
- Fergusson et al (1980)	1156 2 - 5 years	prospective	No significant relationship found between hospital perinatal records and sleep problems.

- 
- + Indicates positive finding of a constitutional factor and  
- indicates negative finding of a constitutional factor.



development tests, or with observed behavior towards peers (Blurton-Jones, Ferreira, Farquhar-Brown, & MacDonald 1978).

A number of temperament variables have been investigated as possible predisposing factors in infants' sleep disturbance. These include activity, approachability, mood and persistence, intensity, rhythmicity, adaptability, sensory threshold, and distractibility. Carey (1974; 1975) studied these temperament factors in 144 babies aged from 6 to 12 months and found an association between night-waking and low sensory threshold only; night-wakers had a greater sensitivity to noise or external stimulation. Moore and Ucko (1957) studied similar temperament variables (but not sensory threshold) and found no temperament differences associated with sleep onset latency and night-waking scores in 3-month-old infants. The influence of rhythmicity in sleep disturbance was studied by Bernal (1973). Neurological examination of 77 infants found that 21 wakeful 10-day-old infants had greater resistance to passive movements, as assessed by rhythmically moving the baby's limbs, trunk, neck and shoulders. In addition, these 21 wakeful infants tended to be more active as 10-day-old infants. Recent studies among older children (Blurton-Jones et al 1978; Fergusson, Shannon, & Horwood, 1981; Richman 1981b; Snow, Jacklin, & Maccoby, 1980) suggest that; either higher activity rates, malleability, restlessness, or excessive crying differentiate wakers from non-wakers. However, the influence of temperament variables upon sleep disturbance in older infants is still unclear.

Constitutional factors related to perinatal and obstetric factors have attracted much research attention. Anders and Hoffman (1973), investigating physiological sleep states in 17 male and 17 female infants, observed that premature newborns had less mature sleep states than full-term infants. Obstetric factors, such as asphyxia at birth (Anders & Hoffman 1973) and length of labour and low neonatal score (Bernal 1973), showed some association with sleep disturbance. Other perinatal and obstetric factors, such as birth weight, gestation ages, apgar scores, foetal distress, mode of onset of labour, mode of delivery, duration of labour, presence of neonatal problems and mean maternal cigarette intake, have not been associated with sleep disturbance (Anders & Hoffman 1973; Chavin & Tinson 1980; Fergusson et al 1982; Richman 1981b).

In summary, the literature concerning constitutional factors in the etiology of sleep disturbance has addressed 14 factors. Few studies considering constitutional factors are free of methodological problems such as small sample sizes, little direct observation and few reliability probes of observations. Questionnaires and interviews, with obvious limitations, were commonly used. The available literature shows that few constitutional factors contribute to the etiology of sleep disturbance. Temperament variables are implicated in sleep disturbance in newborn and older children, but their action and importance is still unclear. Few perinatal or obstetric factors have been shown to be associated with sleep disturbance. The few constitutional

factors that have been associated with the etiology of sleep disturbance do not present any common findings from which treatment modalities can be derived. This is partly due, as Anders and Weinstein (1972) suggest, to the fact that before the advent of the sleep polygram, pediatric sleep disturbance was considered psychological in origin. While sleep polygram studies in the pediatric population have been few, sleep disturbance in young children is characterised by normal sleep polygrams (Anders & Weinstein 1972). The influence of environmental factors present more promising findings from which treatment modalities of sleep disturbance can be developed.

#### Environmental Factors

Sleep researchers have considered such environmental factors as sickness, bottle-fed versus breast-fed children, the number of feeds, age of weaning, age at which wakings first occur, amount of crying, duration of sleeping during the day, housing, socio-economic status, social class, the mother's age, mother's education and the occupation of both parents. Few studies considering environmental factors in the etiology of sleep disturbance have addressed the interaction of parental and child behaviors. Investigations considering the etiology of sleep disturbance which have not measured the parents' responses, and the frequency, intensity and duration of their behavior, have hampered the delineation of environmental

causal factors. For example, the observation of night-waking as a sleep disturbance behavior requires acceptable standardised definitions of parental and child actions, the reported frequency of wakings, the duration between wakings, and the intensity and duration of resistance at each waking.

From a psychodynamic perspective, the etiology of sleep disturbance also is unclear (Sperling 1955). Sleep disturbance is said to be one of the many ways some anxieties are manifest. The psychodynamic treatment of sleep disturbances frequently centres on one or more anxiety states, e.g., separation anxiety (Freud 1965; Hancock 1978; Nagera 1966), castration anxiety (Fraiberg 1950; Hirschberg 1957), infantile anxiety (Nagera 1966), or any conflict within the child-mother relationship. The identification and working through of conflict, trauma, or anxiety brings resolution of the symptoms of sleep disturbance. While infant anxiety and anxiety in mentally retarded children is admittedly difficult to explore, treatment in 3 to 5-year-old children is directed at mastering the anxiety. According to the psychodynamic perspective treatment is carried out before the sleep disturbance carries forward to the next developmental level. This may compound conflicts at the next developmental period; the oral to anal stage (Fraiberg 1950).

Table 6 presents a summary of studies which have addressed environmental factors which influence the etiology of sleep disturbance.

Sickness in infants aged from 3 months appears to cause some disruption in their sleep and waking patterns (Bernal 1973; Moore & Ucko 1957). Hospitalisation of children has also been noted to have an effect on sleep patterns (Beardslee 1976; Bullard 1980; Hagemann 1981) but the actual prevalence of night-waking before and after sickness or hospitalisation has yet to be determined.

The influence of bottle-feeding or breast-feeding on night-waking has led to some debate, especially by proponents of human lactation (Carey 1976; Thevenin 1977; Raphael 1976). Carey (1975) reported that of 144 babies breast-fed beyond 6 months of age, significantly more were night-wakers than bottle-fed babies. However, other studies found neither the mode, duration, or scheduling of feeds, nor the age of weaning to be significantly different in children with sleep disturbance (Bernal 1973; Blurton-Jones et al 1978; Moore & Ucko 1957).

There is evidence to suggest however, that infants who had variable feeding patterns or inconsistent handling by parents were significantly more wakeful (Bernal 1973; Moore & Ucko 1957). Bernal (1973) observed 58 ten-day-old infants and found that at 14 months of age, the 21 children who had sleep

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Insert Table 6 about here  
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Table 6

Studies of environmental factors of sleep disturbance in  
infants and young children

Causal factor	Subjects	Outcome measures	Study outcome
-----			
SICKNESS			
+ Bernal (1973)	77 0 - 14 months	interviews & diary records	Disruption by illness in infants after 12 weeks, infants found to revert to night-waking
+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Illness after 3 months set in train sleep disturbance lasting for months
- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Illness prior to 3 months, little lasting effect
- Seiler (1972)	234 6 - 60 months	questionnaire	Only 8/25 (1/3) of children with recurrent or chronic illness had a sleep problem
BOTTLE-FED VERSUS BREAST-FED BABIES			
+ Carey (1975)	144 6 - 12 months	questionnaire	Continuation of 1974 study; 1977 population children who were breast-fed beyond 6 months had significantly more night-waking problems, 52.4% v. 19.6%, $X^2(1, N = 144) p < .01$
- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Duration of bottle-fed or breast-fed suckling no significant difference between wakers and non-wakers

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Demand, clock, latitude feeders no significant difference between wakers and non wakers, and sleep latency
- Bernal (1973)	77 0 - 14 months	interviews & diary records	Problem group (21) showed no correlation with mode of feeding

#### AMOUNT OF CRYING

+ Bernal (1973)	77 0 - 14 months	interviews & diary records	The mean frequency of crying bouts was more in the 21 sleep problem children than the other 56 infants, 7.5 v 5.9, $p = <.004$
+ Bernal (1973)	77 0 - 14 months	interviews & diary records	The mean duration of crying bouts was 12.5 minutes in the sleep problem group and 14.3 in the rest of the sample, $p=<.05$

#### AMOUNT OF NURSING

+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Excessive bottle-fed or breast-fed babies woke more. Babies who spent the least feeding time with their mother were the next most wakeful group
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#### NUMBER OF FEEDS

+ Bernal (1973)	77 0 - 14 months	interviews & diary records	Problem group (21) were fed more than rest of the sample
- Blurton- Jones et al (1978)	59 15- 39 months	interview & observations	No association between waking and schedule of feeds

#### BIRTH ORDER

- Bernal (1973)	77 0 - 14 months	interviews & diary records	No relationship between birth order and sleep problems
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+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Third or subsequent child in the family was easier to settle for night-waking before 3 months $p = < .05$
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#### DAY SLEEPS

- Blurton-Jones et al (1978)	59 15- 39 months	interview & observations	No difference in the duration of day sleep between wakers non wakers. However, wakers slept less because of the total time awake at night
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#### AGE OF WAKINGS

+ Blurton-Jones et al (1978)	59 15- 39 months	interview & observations	Subjects waking at 15 months continued waking at 27 months
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#### SEASON BORN IN

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Babies born at different times of the year settled in equal proportions by age 3 months
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#### SOCIO-ECONOMIC STATUS

+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	More babies in social class III (skilled class) woke
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#### MOTHER'S AGE

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Mother's age showed no relation to settling age or tendency to wake
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#### MOTHERS EDUCATION

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Mother's education showed no relation to settling age or wakefulness
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# AGE OF WEANING

- Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	Showed no relationship to settling age or tendency to wake in first 3 months
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# HOUSING

- Seiler (1972)	234 6 - 60 months	questionnaire	Number of rooms in a house had no effect on sleep problem group. There was a tendency in children from "high rise flats" to have sleep problems 9/15
- Seiler (1972)	234 6 - 60 months	questionnaire	Sharing a bedroom showed no difference between wakers and non-wakers

# FATHER OCCUPATION

+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	No relationship with age of settling
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# SOCIAL CLASS

+ Moore & Ucko (1957)	104 0 - 12 months	interviews & diary records	A slight trend of more wakers from the skilled social class, $p < .06$
- Bernal (1973)	77 0 - 14 months	interviews & diary records	In the problem group (21) there was no correlation with the social composition of this group
- Seiler (1972)	234 6 - 60 months	questionnaire	No association with social class

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- + Indicates positive finding of an environmental factor and
  - indicates negative finding of an environmental factor.

disturbance had fed more frequently, for shorter intervals, cried more per day, cried more frequently (but for shorter crying bouts), during the first 10 days. This finding suggests that the children who developed sleep disturbance, in their first ten days were more irritable, cried more frequently, and their mothers responded to their cries more quickly (Bernal 1973). Moore and Ucko (1957) found that parents who were having night-waking difficulties also tried a variety of handling methods. These findings suggest an important interaction between parent and child behavior in the genesis and maintenance of sleep disturbance behaviors.

Snow et al (1980) reported longer term stability of crying frequency. The frequency of infant crying at 3 months tended to predict crying behavior at 9 and 18 months. Crying frequency at 9 months predicted the continued crying frequency at 12, 18 and even 26 months. Snow et al (1980) also reported children who cried frequently also woke more frequently. The combination of crying and parental attention could therefore account for the development of night-waking, sleep onset latency, and bedtime delay.

As previously noted, studies have found that early temperament differences, an irritable child, over-responsive or inexperienced parents, and variability of handling are associated with sleep disturbance (Bernal 1973; Blurton-Jones et al 1978; Carey 1974; 1975; Fergusson, Shannon, & Horwood, 1981; Richman 1981b; Snow, Jacklin, & Maccoby 1980). The "coercive behavior hypothesis" proposed by Patterson (1976)

and Patterson and Reid (1973) may account for the development and maintenance of parent and child response chains and sleep disturbance. The coercive behavior hypothesis suggests that behavior traps begin and are maintained by the removal, avoidance, or delay of crying or other aversive child behavior. If parents continue to link the avoidance of a coercive behavior with a particular response, the behavioral response will be strengthened. For example, if a parent responds to a child's cries at 2 a.m. and quietens the child, this removes an aversive event. This response of attending to the child is reinforced for the parent and is thus more likely to occur again. For the child, crying at 2 a.m. will reliably elicit parental attention. Therefore a behavior trap develops where the child cries more frequently (as crying in the past has been reinforced) and the parent responds, as responding in the past has been reinforced (the child quietens).

The coercive behavior hypothesis of parent-child interaction is an appealing method of explaining some constitutional and environmental findings - particularly as it can also explain how parent-child behavior traps can be generalised to other behavior management problems besides sleep disturbance behaviors. Indeed one-third of children with sleep disturbance problems also exhibited other behavior management problems (Richman 1981b).

The effects of sleep disturbance upon families are sometimes serious: fatigue, marital disharmony, marital break up, abuse of children, detrimental effects on siblings,

maternal distress, and stress on the family members (Chavin & Tinson 1980; Richman 1981b). The assessment and implementation of behavioral treatments based on identifying such behavior traps requires observation and recording of overt parent and child responses. The conditioning of other appropriate responses, using the coercive behavioral hypothesis, assists in the development of behavioral treatments of sleep disturbance and other behavior management problems in children.

In summary, the consideration of the etiology of sleep disturbance, presented in Tables 5 and 6, has been hampered by methodological problems. Few studies have employed direct or multiple measures of sleep disturbance. Questionnaires and interviews have been the common method of enquiry. Improved methodology in this research area would include: the employment of common behavioral definitions, and the use of direct observation with acceptable levels of reliability.

Studies presented in Tables 5 and 6 concerned with constitutional and environmental factors of sleep disturbance present some evidence that temperament differences, variable feeding patterns, inconsistent handling of children and frequent crying schedules are associated with sleep disturbance problems. These seemingly unrelated constitutional and environmental factors may be explained by the coercive behavior hypothesis. This model of behavior analysis centres on the development and maintenance of parent and child behavior traps of sleep disturbance. Later discussion will outline how the coercive behavior hypothesis can explain the generalisation

of sleep disturbance behavior traps to other behavioral management problems.

## TREATMENT APPROACHES

There has been a paucity of studies evaluating treatment approaches to sleep disturbance. Generally, three strategies have been reported in the literature: psychotherapy, medication, and behavioral treatments.

### Psychotherapy

According to psychodynamic theory, development of the sleep rhythm is mediated through the infant's relationship with his/her mother (Gifford 1960), and case reports (Fraiberg 1950; Hancock 1978; Nagera 1966; Sperling 1955) often report treating the child's sleep disturbance by counselling the parents. One such demonstration is presented in Sperling's (1955) review. She specifically details instructing the parents to leave their 22-month-old child to cry (the extinction procedure) because the mother was not neurotic. In a second case, the parents were instructed to cease taking their 3-year-old child into their own bed and to reduce severe toilet training practices (Sperling 1955), and in another, parents were instructed to cease toilet training a 13-month-old child (Fraiberg 1950).

Unfortunately, there are no controlled evaluation studies of different psychotherapy treatment techniques. Therefore psychotherapy treatments must be regarded with some degree of caution. Also, it is not clear how psychotherapy would treat anxieties in mentally retarded children with sleep disturbance, nor, how the counselling of parents would account for the remission of the child's sleep disturbance.

### Medication

Many parents seek the help of their physician for medication as a last resort treatment of sleep disturbance (Chavin & Tinson 1980; Werry & Carlielle 1982). A New Zealand study found sleep disturbance was the most common non-medical problem in infants seen by 69 family physicians (Werry & Carlielle 1982). Pediatric sedatives or other medication with sedative side-effects have been widely prescribed for sleep disturbance in children. DeMyer (1979) reported 50% of autistic children had been prescribed medication. Ounsted and Hendrick (1977) reported one in four 18-month-old children had been given medication. Werry and Carlielle (1982) reported one in three children New Zealand had been prescribed medication by 5 years of age. Similar figures have been reported for sedatives used in young children in Australia (Medline Data Base 1983). Chavin and Tinson (1980) reported 71% of parents with 8 to 36-month-old children, resorted to medication, usually sedatives, for any combination of wakeful behaviors.

Despite the wide use of medication in the treatment of night-waking, sleep onset latency and bedtime delay, the efficacy of medication has not been unequivocally demonstrated. Advice given regarding the use of sedatives for sleep disturbance has been extensive. Some authors have recommended the use of sedatives in children "to break the waking habit" (Battle 1970; Carey 1974; Illingworth 1966; 1968; 1972b; Lask 1977;). Others recommend medication alone for one week (Bax 1980; Jackson & Rawlins 1977; Wheatley 1969) or with behavior modification (Schmitt 1981; Valman 1981). Some authors advise against the use of medication because of their experience with drug-dependent insomnia in adults and/or because habituation is rapid, even in children (Kales 1971; Kales, Bixler, Tan, Scharf, & Kales 1974; Kales and Kales 1974). In some case reports it has been stated that sedatives do not provide a long term solution to sleep disturbance in autistic (DeMyer 1979) and normal children (Chavin & Tinson 1980; Douglas & Richman 1984; Jones & Verduyn 1983; Pollitt & Eichler 1976; Richman 1981a; 1984; 1985a; Richman et al 1985b; Seymour et al 1983a; Sperling 1955; Sumpter 1975; Valman 1981; Weissbluth 1982; Wright, Woodcock, & Scott 1970).

As Rapoport, Mikkelsen, and Werry (1978) point out it is indeed a sad commentary that only two studies have attempted to demonstrate the efficacy of sedatives in pediatric populations. The first, and until recently the only study to evaluate a pediatric sleep sedative, was that by Russo, Gururaj, and Allen (1976). In a sample of 50 children aged 2 to 12 years,

Russo et al (1976) conducted a two-week, double-blind, placebo-controlled, crossover clinical trial. They found 1 mg/kg diphenhydramine (Benadryl) was superior to placebo as a sleeping aid for pediatric patients.

In the other study, Richman (1985a) reported a double-blind trial 30 mg/5 ml of the sedative hypnotic trimeprazine tartrate. Twenty-two 1 to 2-year-old children were randomly assigned to one of two groups: two weeks baseline, and in a randomised sequence given either placebo or drug for two weeks each with an intervening period of two weeks. Outcome measures included a composite sleep scale score computed from parental sleep diaries and a semi-structured interview with parents. The interview was to ascertain if the drug had been helpful, side-effects, and changes in the child's moods and appetite. While some initial improvement with sleep onset latency and bedtime delay, and less waking at night on the drug was recorded, sleep diaries revealed that these improvements were only moderate (Richman 1985a). Although six months after the drug trial some children were waking less or for a shorter duration, there was no permanent effect on the sleep pattern nor were any of the children sleeping through the night after the drug (Richman 1985a). Comparing a number of collateral sleep disturbance behaviors computed from composite sleep scale scores, Richman (1985a) reported no significant change between baseline and six month follow-up. Interestingly, parents in Richman (1985a) reported that diary recording of sleep and waking behaviors were helpful, suggesting that both parents and experimenters



benefit from diary recordings of treatment outcome. These findings appear consistent with studies in adults where it is widely known that for many subjects, sedative hypnotics are not effective or may even have adverse effects in some subjects (Kales & Kales 1974).

It is obvious that more controlled studies in pediatric populations are required to determine the extent to which medication is used in the treatment of sleep disturbance, how rapidly habituation to medication takes place, and what place medication will play in future treatment strategies for sleep disturbance. The need for other treatment options for sleep disturbance is apparent, given that the efficacy of medication in children has not been proven.

#### Behavioral treatments

Behavioral treatments of sleep disturbance have made use of extinction, extinction plus punishment, graduated extinction, fading of parental attention, and positive bedtime routines. These treatments place their emphasis upon learned behavior and focus on the relationship between overt parent and child behaviors.

#### Extinction

Extinction is defined as a procedure in which the reinforcer is no longer delivered for a previously reinforced

response (Kazdin 1984). For example, the parent lying down with the child reinforces the parent by successfully getting the child to sleep. For the child, parental attention and lying down with the parent is reinforcing. Extinction requires the withdrawal of the reinforcer (the parent) for a previously reinforced response (the child going to sleep). Upon the parent's withdrawal of attention the child may cry before going to sleep. For this reason extinction has been discouraged by some authors (Battle 1970; Jolly 1981; Lask 1977). However, many authors recommend it as a viable alternative to other treatment options (Bax 1980; Carey 1974; Illingworth 1968; 1972a; 1972b; Inglis 1976; Powell 1972; Schmitt 1981; Spock 1961; Sumpter 1975; Valman 1981; Wilks 1975; 1977; Younger 1982).

The first published behavioral treatment of sleep disturbance used the extinction with the duration of crying as the outcome measure (Williams 1959). Bedtime delay and sleep onset latency behavior - crying and tantrum behaviors - of a 21-month-old boy were eliminated after parents were instructed to stop going into the child after he was put to bed. That their attention was maintaining the troublesome behavior was confirmed. The relationship between overt parent and child behavior, the basis of behavioral treatments of sleep disturbance, was demonstrated by a relapse of tantrum behavior when the boy's aunt went into the child's bedroom and stayed with him until the tantrum ceased. A second extinction phase was instituted and results reported after 10 days showed the

tantrums had again ceased. Follow up at 2 years showed that tantrums had not been a problem following treatment.

Wolf, Risley, and Mees (1964) used a combination of extinction and time-out to treat bedtime delay tantrums in a three and half-year-old autistic child. Treatment was initially carried out in a hospital setting and parents trained to use the combined procedures at home. Parents were instructed to put the child to bed. If the child began a tantrum or came out of bed the child was put back to bed with the door closed. Once the child was asleep or when the tantrum ended, the door was reopened. Results showed that tantrums ceased after the sixth night. Once again, a functional relationship between parental and child behavior was demonstrated when the parents reversed their behavior (due to sickness), the child responded with an increase in out-of-bed behavior.

Wright, Woodcock and Scott (1970) described the successful treatment of a 3-year-old girl with minimal brain dysfunction, using the duration of crying as their outcome measure. Parents were instructed to ignore the child's crying. On the first night the child cried for 90 minutes, but by the third night for only two minutes. A relapse occurred on the 16th night when the child resorted to switching the bedroom light on. Removal of the light bulb saw a return to only one or two minutes' protest. Again the relationship between parent and child behavior and sleep disturbance was demonstrated. At 10 weeks follow-up, the subject was sleeping 10 to 11 hours each

night without crying or protesting at bedtime.

The largest treatment study of sleep disturbance was by Seymour, Bayfield, Brock and During (1983a) who, in an AB design, used extinction to treat 193 children, aged from 1 to 6 years, who came to an outpatient family counselling clinic. Treatment outcome was measured by parental daily diary recordings of the child's sleep and waking pattern. Treatment sessions were carried out in small groups or individually. Parents were instructed to withdraw attention, i.e., ignore any crying, but if the child was in any physical distress to investigate with minimum attention. If the child came out of bed the door was to be closed for 10 minutes. Regular phone contact and interviews were an additional component of the one-month treatment programme. The treatment package had impressive results. Before treatment the average number of nights children woke was 6.63 per week. Following treatment this decreased to 1.57 per week. At six months followup the children were waking, on average, one night per week. Before treatment only one child slept through four or more nights per week but after the introduction of treatment 21% of children (40/193) slept through four or more nights per week. After week two, 52% of children (100/193) slept through four or more nights per week, and by the fourth and the final week of treatment, 78% of children (150/193) were sleeping through four or more nights per week.

### Extinction plus Punishment

Rapoff, Christophersen and Rapoff (1982) used extinction plus punishment in the treatment of sleep onset latency and bedtime delay. Parents of six 24 to 54-month-old children were instructed in the extinction plus punishment procedure. Four 22 to 38-month-old non-problem children were used as a control sample. Outcome measures included voice recording of the first 30 minutes at bedtime. Trained independent persons rated the reliability of bedroom tapes. Bedroom reliability averaged 88%. The extinction procedure required parents to ignore the child's vocalisations. If the child came out of the bedroom a punisher (a smack) was administered and the child was returned to bed. Only one parent objected to the punishment component.

Results proved disappointing with only 50% (three children) responding to the treatment. In explaining these results, the compliance of treatment procedures was of major concern to the authors (Rapoff et al, 1982). Perhaps the use of extinction with the punishment component may have caused more resistance from parents than was indicated to health care providers. Despite only 50% success, a consumer satisfaction questionnaire showed that all parents rated the procedures as being effective in making positive changes in their child's behavior at bedtime.

### Graduated Extinction

Graduated extinction is defined as the (gradual) withdrawal of parental reinforcement for a previously delivered reinforced response (Kazdin 1984). For example, the parent lying down with the child reinforces the parent by successfully getting the child to sleep. For the child, parental attention and lying down with the parent is equally reinforcing. Graduated extinction requires the withdrawal of the reinforcer (the parent) for a previously reinforced response (the child going to sleep). Upon the parent's withdrawal of attention the child may cry before going to sleep. However, graduated extinction withdraws the parental attention gradually rather than completely at the beginning of treatment.

Lawton (1985) used the gradual reduction of parental attention for night-waking, sleep onset latency and bedtime delay with seven 6 to 19-month-old children. The main aim of her study was the development of an alternative to the extinction procedure that was more acceptable to parents. Extinction has been criticised for its aversive side-effects (e.g., the child crying), which some parents find difficult to accept. Outcome measures in this study included daily diary recordings by parents and a social validation measure of acceptance of this procedure. Parents were instructed to gradually reduce the time, from 15 to 0 minutes, that they were paying attention to the child when the child was put to bed or

woke up at night. If the child was not asleep within the attention-time the parent was instructed to leave the child. Of seven subjects, two did not show significant improvement. Some difficulties with treatment compliance were reported. Graduated extinction was not successful in avoiding the aversive side-effects of extinction. Two month followup showed improvements were maintained in four children.

### Fading

The fading procedure is defined as the gradual removal of reinforcement, as in the progressive thinning of a reinforcement schedule (Kazdin 1984). For example, in the treatment of sleep problems this would mean reducing the amount of time a parent spends with a child each time the child woke. Unlike graduated extinction, the child is not left to cry if still awake.

Jones and Verduyn (1983) reported the successful treatment of 19 children, aged 4 to 54 months who had problems of night-waking, sleep onset latency and bedtime delay. Treatment outcome measures included a parental daily recording of parental responses and the child's sleep and waking pattern. The parent was instructed to sit in the child's room with minimal interaction, until the child was asleep. Next the parent gradually withdrew from the bedroom, then sat outside the bedroom with minimal interaction, and finally away from the bedroom. Waking later in the night was managed similarly, with

the gradual withdrawal of the parent from the bedroom. The authors report that six months after treatment 84% of the 19 children were judged as having a resolved sleep problem : 9/19 fully resolved and 7/19 partially resolved (Jones & Verduyn 1983). Jones and Verduyn (1983) noted that treatment outcome was significantly better when both parents were involved in the treatment programme and treatment was less likely to be favourable when there was marital discord.

Howlin (1984) presented a brief report of the gradual removal of reinforcement (i.e., a mother's inflatable bed) from the bedroom of an autistic child aged 5 years, 9 months. The fading programme was as follows: during week one the mother's inflatable mattress was next to the child's bed, during week two a few inches away, and during week three the mother slept with her head in the opposite direction to the child's. During week four the mother was no longer able to touch the child, and weeks five to eight saw the gradual withdrawal of the mattress until the parent slept in her own bed.

Richman, Douglas, Hunt, Lansdown and Levere (1985b) used fading plus token reinforcement in a study of 35 children aged 12 to 48 months. Outcome measures included daily recordings by parents of the child's sleep and waking pattern and a behavior checklist (Richman 1977). An individual treatment programme was developed that combined gradual withdrawal of parental attention with the earning of positive reinforcement such as praise and star charts to reinforce appropriate behavior.



Results reported 90% (27/30) improvement in the 30 out of the 35 children who completed treatment, or 77% (27/35) effectiveness at four months followup. Improvement in sleep disturbance behaviors brought a marked improvement in three children with other behavior management problems. With three other children whose sleep improved, this improvement did not generalise to other problem behavior. However, in three children whose sleep did not improve, neither did their other behavior problems. According to Richman et al (1985b) their findings supported their hypothesis that night-time behavior can be radically changed within a short time because parental responses were extremely important in maintaining waking behavior. These results are also consistent with the coercive behavior model of analysis. Because with the improvement of sleep disturbance in 3 children behavior traps may not have been strengthened by parents-child response chains. Three other childrens' sleep disturbance improved, but without programming for the removal of aversive responses which maintain behavior traps of problem behaviors. It is understandable why these problem behaviors did not spontaneously cease. The three other children who did not show any improvement in their sleep disturbance, the coercive behavior model predicts that neither should their problem behaviors spontaneously cease.

### Positive Bedtime Routines

Positive bedtime routines require the parents to repeatedly practise a chain of appropriate pre-retirement activities in order to suppress resistance to bedtime preparation by the child. Milan, Mitchel, Berger and Pierson (1981) used enforced retirement, baseline and positive routines to treat a 25-month-old and a 4-year-old child with sleep onset latency and bedtime delay. Outcome measures included parents scoring on a scale of 1 to 3, bedtime resistance, the number of minutes past appropriate bedtime and duration of in-bed resistance. The authors explained the treatment procedures as follows: enforced retirement - parents attempted to force the child to the bedroom at a set bedtime. Baseline phase - parents waited for the child to become tired and fall asleep. Positive bedtime routines - six guidelines for bedtime routines were chained with a 15 minute delay in bedtime if any resistance was encountered. Results showed positive bedtime routines promoted pre-retirement cooperation and reduced bedtime resistance. After one year, followup showed positive bedtime routines were better than enforced retirement or extinction, in the treatment of sleep onset latency and bedtime delay. However, enforced retirement was not specifically programmed for, and was measured for five nights only. Positive bedtime routines were specifically programmed for 10 nights of treatment measurement. These results indicated that

positive bedtime routines could be an alternative treatment for sleep onset latency and bedtime delay rather than employing the extinction procedure. However, to describe positive bedtime routines as a rapid treatment alternative to extinction would require more detailed treatment comparisons using a more robust experimental design than the A B C design used in this study (Milan et al 1981).

#### Other treatments

Other treatments used for sleep disturbance include relaxation, taking the child into the extended parental bed and tape recordings of a mother's heart beat.

Relaxation was successfully employed by Weil and Goldfield (1973) in the treating an 11-year-old girl with sleep onset latency and bedtime delay. Initially, the therapist used relaxation training in the girls home. Treatment continued using a 30 minute self-relaxation tape with instructions by the therapists for two weeks, a 15 minute relaxation tape for one week, and finally a 5 minute tape in the last week. Six-month treatment followup showed sleep onset latency and bedtime delay had been completely eliminated.

Bringing the child or children into an extended parental bed has been suggested as a viable treatment alternative for sleep disturbance (Thevenin 1977; see Appendix J photographs). The author argues that "there is something natural, right and salutary in the desire of young children to convert the

parental bed into a family bed" (p. xvii). The commitment to 24 hour parenting suggested by Thevenin (1977), may be suitable for some parents, while the family bed choice is for couples to make.

The efficacy of tapes of a mother's heart beat and the extended parental bed, as viable treatments, have yet to be proven under controlled conditions.

In summary, current data suggest that extinction offers rapid cessation of sleep disturbance. Many authors recommend this procedure as a viable treatment option for sleep disturbance. However, studies using extinction have not reported actual followup data for longer than six months after treatment. The extinction procedure has been discouraged because of adverse side-effects. The one study combining extinction plus punishment procedures reported that parental treatment compliance was of major concern. Graduated extinction may delay the withdrawal of parental reinforcers, but problems with treatment compliance again hampered this procedure. The fading of parental attention appears a promising procedure for parents who feel they cannot suddenly withdraw their reinforcement of the child's sleep disturbance behaviors. Richman et al's (1985b) combination of fading plus reinforcement offers an alternative treatment approach for the older preschool child. The use of positive bedtime routines before bed shows promise in treating sleep onset latency and bedtime delay only in children.

## CONCLUSION

Prevalence studies indicate 33 - 55% of normal children between 6 to 60-months have night-waking problems. Sleep onset latency and/or bedtime delay occurs in about one in six children aged 6 to 60-months. Prevalence studies are not directly comparable because of different definitions of night-waking, sleep onset latency, and bedtime delay. However, prevalence figures support the notion that night-waking, sleep onset latency, and bedtime delay tend to peak in 24-month-old children. Several studies reported that sleep disturbance begins at an early age in some children, with 5 - 10% of children experiencing chronic night-waking for four years or more.

The etiology of sleep disturbance remains unclear. Studies investigating it have found few relationships with constitutional or environmental factors. Constitutional factors such as child temperament and low sensory threshold to any noise or stimulation have been observed in wakeful children. Environmental factors investigated strongly suggest a common thread of early coercive behavioral processes of parent-child response chains. Several studies suggested that sleep disturbance may be due to an irritable child, who cries frequently, cries more per day, has more feeds per day, shorter feeding intervals with variable feeding patterns, and who receives inconsistent handling. Behavioral procedures

which fade or eliminate overt parent and child behaviors associated with maintaining sleep disturbance have sometimes shown rapid success, further suggesting that maladaptive parent-child response chains are associated with sleep disturbance.

The coercive behavior hypothesis suggests behavior traps begin and are maintained by the removal, avoidance, or delay of crying or other aversive child behavior. If parents continue to link the avoidance of a coercive behavior with a particular response, the behavioral response will be strengthened. The combination of crying and parental attention could therefore account for the development of night-waking, sleep onset latency, and bedtime delay, and sleeping in the parental bed, i.e., the crying infant and parental attention could begin a behavioral trap of any of these overt sleep disturbance behaviors. The coercive behavior model of parent-child interaction formalised by Patterson (1976) and Patterson and Reid (1973) is an appealing means of explaining some constitutional and environmental findings, particularly as it can also explain how parent-child behavior traps can generalise to other behavior management problems besides overt sleep disturbance behaviors.

Other treatment options include psychotherapy, the extended parental bed, and tapes of a mother's heart beat. It is not clear how psychodynamic therapy (counselling the parents of infants) accounts for the remission of child sleep disturbance. The extended parental bed and tapes of the

mother's heart beat have not been tested under controlled conditions. Therefore these alternative treatments should be regarded with some degree of caution. Pediatric sleep sedatives, prescribed to as many as one in three children by 5 years of age has not proven efficacious in the long term. Regrettably, only two studies have investigated two of a wide range of pediatric sleep sedatives. The effectiveness of medication in the treatment of sleep disturbance, the rate of habituation, and the use of medication as a future option, are questions still to be answered. While the effects of sleep disturbance upon the family has not been extensively researched, parental fatigue, admitted abuse of the child, marital arguments and discord, detrimental effects on siblings, curtailing of social and sexual activities of parents and the development of other behavior management problems in the child indicate improvement in treatment options of sleep disturbance with systematically controlled studies could make the difference in the lives of many parents and children.

According to current treatment data, extinction offers the most rapid cessation of sleep disturbance behaviors such as night-waking, sleep onset latency, bedtime delay, and sleeping in an inappropriate place. Two studies using graduated extinction and extinction plus punishment were hampered by treatment compliance. The fading of parental attention and fading plus reinforcement offer promise for parents who do not wish to employ extinction with their children.

## Experiment 1

### THE EFFECTS OF EXTINCTION ON SLEEP DISTURBANCE IN INFANTS

Sleep disturbance can be defined as a combination of complaints and behaviors associated with sleep (Coates and Thoresen 1981). These complaints and behaviors may include one of the following: failure to sleep during the night (night-waking); initial difficulty in falling asleep (sleep onset latency); bedtime refusal and resistance (bedtime delay); and sleeping in an inappropriate location, usually the parental bed. Prevalence studies show an increase in night-waking and sleep onset latency in children aged 6 to 24 months and a decrease in these sleep behaviors as children approach 5 years of age. Direct comparison of prevalence studies are hampered by different definitions of night-waking but about 33% - 50% of children aged 6 to 24 months have night-waking problems (see Table 1). Sleep onset latency is less prevalent in 6 to 24-month-old children, with one in six having sleep onset latency and bedtime delay (see Table 2). The prevalence of sleep disturbance in newborn to 6-month-old infants is unknown.

Figures of the cost of treatment for sleep disturbance, borne by families, are not available. However, the cost of medication is available. Table 7 shows the number of prescriptions and cost to the Health Department for child sleep sedatives from April 1982 to March 1986 (see Appendix K Health Department correspondence). These findings show the increase of medication payments in the health budget for



sleep sedatives. Estimates of physician's fees and over-the-counter sales of child sedatives suggest that an improvement in treatment of infant sleep disturbance without medication would benefit parents financially. Other financial costs to the family of fees and non-prescription sedatives could double the final figure per year. As noted previously, the treatment of sleep disturbance would also benefit family quality of life. Several studies have reported the detrimental effects of sleep disturbance upon spouses, families and children (Chavin & Tinson 1982; Richman 1981b).

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Insert Table 7 about here  
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To date, four treatment studies of sleep disturbance in infants have used such behavioral procedures as: extinction, graduated extinction, and fading of parental attention (Jones & Verduyn 1983; Lawton 1985; Seymour et al 1983a; Williams 1959). Behavioral treatments measure overt parent and child response chains of sleep disturbance behaviors. These events form the basis of treatment programmes to modify the behaviors that maintain sleep disturbance.

The elimination of sleep disturbance in young children was the primary goal of this study. Firstly, the study aimed to evaluate the use of extinction only with 13 infants aged 6 to 24 months and, secondly, to assess if treatment gains could be maintained at 18 month followup.

Table 7

The amount, and estimated cost each year of child sleep sedatives

Sedative Trade Name	Total no of scripts	Cost \$	Milli Litres	Estimated number of scripts	Child sedative costs
-----					
April 1982 - March 1983					
Benedryl	3,100	7,100	528,900	1,000	5,000
Phenergan	53,700	121,700	5,825,700	26,850	250,000
Vallergan	25,800	74,700	2,986,500	8,510	118,430
					-----
					\$373,430
April 1983 - March 1984					
Benedryl	2,200	6,100	626,000	1,000	5,000
Phenergan	46,800	114,100	5,410,300	24,400	217,800
Vallergan	17,700	55,200	2,167,900	5,840	81,248
					-----
					\$304,048
April 1984 - March 1985					
Benedryl	4,200	10,800	702,000	1,000	5,000
Phenergan	46,800	129,500	5,656,900	28,353	263,966
Vallergan	18,800	57,000	2,159,100	6,204	86,297
					-----
					\$355,263
April 1985 - March 1986					
Benedryl	6,000	17,000	1,469,100	1,000	5,000
Phenergan	63,200	200,100	7,905,400	44,152	411,055
Vallergan	21,600	65,700	2,764,900	7,128	99,150
					-----
					\$515,205
-----					

## METHOD

### Subjects and Setting

Eight male and 5 female children aged 6 to 16 months were accepted into this study. Inclusion into the study was based on the following criteria: the child had a sleep disturbance problem only, had been examined by a physician in the last three months, and had no other symptoms e.g., a hernia, history of convulsions, mental retardation, etc. Interviews were carried out at the University of Canterbury's clinical suite. Upon referral parents were contacted by telephone to assess if the child met the criteria for entry into the study. Parents were given a booklet of daily diary recording sheets complete with information on how to record outcome measures (see Appendix B). Children came from the metropolitan area of Christchurch (New Zealand) which has a population of approximately 300,000.

### Behavioral Measures and Definitions

Outcome measures were: duration from bedtime to silence (sleep onset latency), duration of time past normal bedtime (bedtime delay) number of wakings per night greater than 2 minutes (night-wakings), total time awake each waking, type of parental intervention at each waking, time the infant woke

each morning, and the total time slept over a 24-hour day. The independent variable was the withdrawal of parental attention, at bedtime and each waking, until the family's normal rising time in the morning.

Sleep disturbance was defined in this study as a combination of behaviors and complaints associated with sleep. A waking was defined as when: (i) The child woke a parent, (ii) The child was awake more than two minutes, or (iii) A parent attended the child.

A composite sleep scale was constructed from similar items reported by Richman (1981b) - see Appendix H. This scale was later used as an outcome measure in the treatment of preschool children with sleep disturbance (Richman et al 1985b) and a drug study (Richman 1985a). The composite sleep scale contained six items which scored the intensity, frequency, and duration of the outcome measures. Each of the outcome measures were scored on a scale of 0 to 4 (see Appendix H). The weekly score of each outcome measure computed: the mean number of minutes of sleep onset latency per week, the number of nights at least one criteria waking occurred per week, the mean number of wakings per night, the mean time awake per waking, the number of occasions and duration that the child spent in the parents' bed, and the total time slept in a 24-hour day. A composite sleep scale score of 18 to 24 indicated an acute sleep disturbance problem, 11 to 17 is severe, 5 to 10 is moderate and 0 to 4 is slight (see Appendix H).

## Procedure

A multiple baseline across subjects design was used. Each subject received a minimum of two weeks baseline, six weeks treatment, with six-month and 18 months followup after treatment. Each referral was assessed according to the inclusion criteria described above. If inclusion was established over the phone parents were then sent the recording and information sheets. To initiate baseline recordings, parents were instructed to continue what ever interventions they were using, including the parental bed. Sleep sedatives were asked to be faded prior to baseline. However, if parents needed a less wakeful night, the use of sleep sedatives was to be recorded.

Both parents and child were present for an initial assessment interview. A structured interview of one hour was used to obtain a full case history and establish that the criteria for entry into the study were indeed met (see Appendix C). If parents were not already recording data, they were given a booklet of daily diary recording sheets complete with information on how to record outcome measures (see Appendix B). Those children who did not meet the criteria for inclusion in the study, at the telephone or initial assessment interview, were assisted in gaining a referral to an outpatient family treatment agency.

Daily diary recording was a 24-hour recording of infant

sleep and waking patterns. Parents were followed up two days after the initial telephone interview to confirm they understood recording instructions of outcome measures.

Intervention. At the treatment interview parents were given a standardised written program as follows (see Appendix D). The child was to be put in her/his bed or cot after the usual bedtime ritual. The child was not to be attended to unless absolutely necessary. That is, if the parents thought the child's cry was a hurt cry rather than an angry cry, or were concerned, parents were to investigate their concern with minimum reinforcement. For example, if the child was caught in the bed clothes or such like, parents should remedy the situation in a business-like manner, then using the hall light only, leave the child immediately. In the morning parents should go into the child's room at the family's usual rising time.

The ethics committee of the University of Canterbury had previously approved this procedure. Safeguards were also programed for. The extinction program was postponed if the child was ill during treatment. In addition, if parents felt there was any cause for concern they were instructed to investigate their concern without providing any reinforcement for the child's sleep disturbance. Regular daily phone contact was programmed and faded to weekly phone contact as parents became more confident with the extinction procedure.

Followup. Followup data was collected 6 and 18 months after treatment had ceased.

#### Structured Interview

Thirteen children aged 6 to 16 months - eight males and five females met the inclusion criteria. All children came from two-parent families. Nine older siblings were also receiving treatment in the preschool sleep study. One family had two older siblings receiving treatment in the preschool study and one infant in this study. Four parents came into the study with their first child. Children were referred from many sources: three children were referred by their physician, and two children by public health professionals. Eight children came into the study from advertisements placed in kindergatens, playcentres (see Appendix A), and a newspaper article about the sleep program being run at the University of Canterbury (see Appendix I).

Sleep onset latency was a problem for only four parents: three of these four children were 11 to 16 months of age. The mean number of wakings was two per night: three children (23%) woke once per night, six children (46%) woke twice per night, and four children (31%) woke three or more times per night. Twelve of the 13 children slept during the day, and they continued to do so after treatment. Only seven children were sleeping during the day after 18 months followup.

Six children (46%) came into their parents' beds frequently, or at some time during the night. Three of them stayed in their parents' beds all night, and the other three came into their parents' beds and were returned to their own beds once asleep.

Five parents managed current night-waking with attention only. Ten parents said their children had a sleep problem from a very early age, while the other three children had developed sleep disturbance from the third to eighth month. When parents were asked to identify what precipitated the sleep disturbance problem, two could not identify any cause, nine said sickness had contributed, and two parents said moving house had caused sleep disturbance. Possible precipitation of sleep disturbance from obstetric and neonatal factors was investigated. Three mothers reported their pregnancies were not normal. One of these children was induced and finally delivered by caesarian. The other two mothers reported bouts of vomiting throughout their pregnancy. Six parents (46%) reported difficulties in the birth of the child with sleep disturbance. Four children (31%) were induced deliveries only; of these one child was delivered by caesarian and one mother required the assistance of an analgesic for the long and difficult birth of her first child. Advice on how to handle sleep disturbance came from family, friends, health professionals, physicians, books, or magazine articles. Most parents had received advice from one or more of these sources.



Behavioral approaches used also varied. Two parents had used dim night lights in the child's room. Three parents had used an infant's feeding-bottle of milk to elicit sleep after each waking. Four parents had attempted to sit and cuddle the child to sleep. Six parents (46%) had attempted extinction one or more times. Six parents (46%) used sleep sedatives when required: eight (62%) had used sleep sedatives in the past. One child received Pryndette Syrup (Paracetamol, doxylamine succinate and alcohol - an antipyretic and mild sedative for infants and children less than 1 year of age). Three children were prescribed Phenergan (Promethazine Hydrochloride) and two were prescribed Vallergan (Trimeprazine Tartrate). Parents reporting the use of sleep sedatives had abandoned them because the child habituated to the drug or required another stronger sleep sedative, and/or the parents reported they did not want the child to become reliant on sleep sedatives. Parents currently using sleep sedatives did so sparingly, or when they needed a less broken night's sleep. None of the six children currently administered sleep sedatives slept through the night without night-waking and requiring parental attention. This was demonstrated in the final week of baseline by Hayden (see V in Figures 1 & 2).

### Reliability

Reliability probes were carried out using an Esterline Angus Chart Recorder (model A620x) with a microphone attached

to a Lafayette Voice Activated Response Controller (model 662a see Appendix G). The microphone was placed in the child's bedroom. Before putting the child to bed, parents switched the chart recorder on, noting the switch-on time and date on the chart recorder paper. The chart recorder paper speed was set at 7.6 centimetres per hour. A minimum 2.5 millimeter marking was evidence of meeting the criterion for waking of two minutes or more.

An independent person was trained to read and count the night-wakings on the chart recorder paper using a ruler calibrated with the paper speed. This ruler measured the minimum criterion for waking and subsequent duration of each waking. Event-by-event agreements of night-wakings over disagreements plus agreements was scored between diary recordings and the chart recordings (Kazdin, 1982). The two reliability probes were 33% of baseline length. Reliability probes were 50% of Alecia's treatment phase and 27% of Peter's treatment phase. Alecia's parental diary recordings yielded a reliability score of 66% for a baseline probe of one week and 62% for a treatment probe of two weeks. Peter's parental diary recordings yielded a reliability score of 33% for a baseline probe of one week and 33% for a treatment probe of three weeks.

This study of 13 infants used the extinction procedure to withdraw parental attention at bedtime and night-wakings. Parents were supported as behavior modifiers with regular phone appraisals and reinforcement of their progress with the extinction procedure.

## RESULTS

Figure 1 shows the composite sleep scale scores each week across baseline, treatment, six month and 18 months followup. Two children, Phillipa and Katherine, maintained a baseline composite sleep scale score in the acute range (18-24). Nine children maintained a baseline composite sleep scale score in the severe range (11-17) and one child a baseline composite sleep scale score in the moderate range (5-10). Jonathan changed from the acute to the severe range during baseline. Hayden's parents used Vallergran on one night, the week before treatment started. The two week baseline was reduced for Mark to accommodate his parents who wanted to treat both children (one in this study and one in the preschool study - Peter in experiment 2), while both parents were available for the first week of each treatment phase.

After the introduction of treatment, Figure 1 shows the decline in composite sleep scale scores, occasionally interrupted by sickness (marked as  $\diamond$  in Figures 1). At the completion of treatment all children (100%) were within the slight range (0-4) of the composite sleep scale score. Six month after treatment ceased all 10 parents who recorded followup data had maintained treatment control of sleep disturbance: two children were lost to followup (LTF), one parent did not record six month followup data. Eighteen months after treatment ceased 10 of the 11 parents (91%) who recorded followup data had maintained treatment gains within

the slight range (0-4) of the composite sleep scale. Lara's relapse was due to nocturnal enuresis; not night-waking. Two children, Mark and Lucas, were lost to 18 month followup (LTF).

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Insert Figure 1 about here  
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The reduction of the composite sleep scale scores across the six outcome measures was significant using a repeated measures T test. Comparison between baseline and the last two weeks' treatment composite sleep scale scores showed parents had achieved significant change across the six outcome measures,  $t(12) = 11.79$ ,  $p = < .001$ . Comparison between baseline and six month followup showed treatment gains were maintained,  $t(9) = 8.06$ ,  $p = < .001$ . Comparison between baseline and 18 month followup showed treatment gains achieved across the six outcome measures were maintained  $t(10) = 3.90$ ,  $p = < .002$ .

#### Night-Waking

Figure 2 presents the number of nights waking per week across baseline, treatment, six month followup and 18 month followup. Baseline mean number of nights awake per week was six. Baseline data for the number of nights awake per week were stable. That is, except for Lara, all subjects number of

FIGURE 1. Composite sleep scale scores of 13 infants across all experimental conditions in Experiment 1.

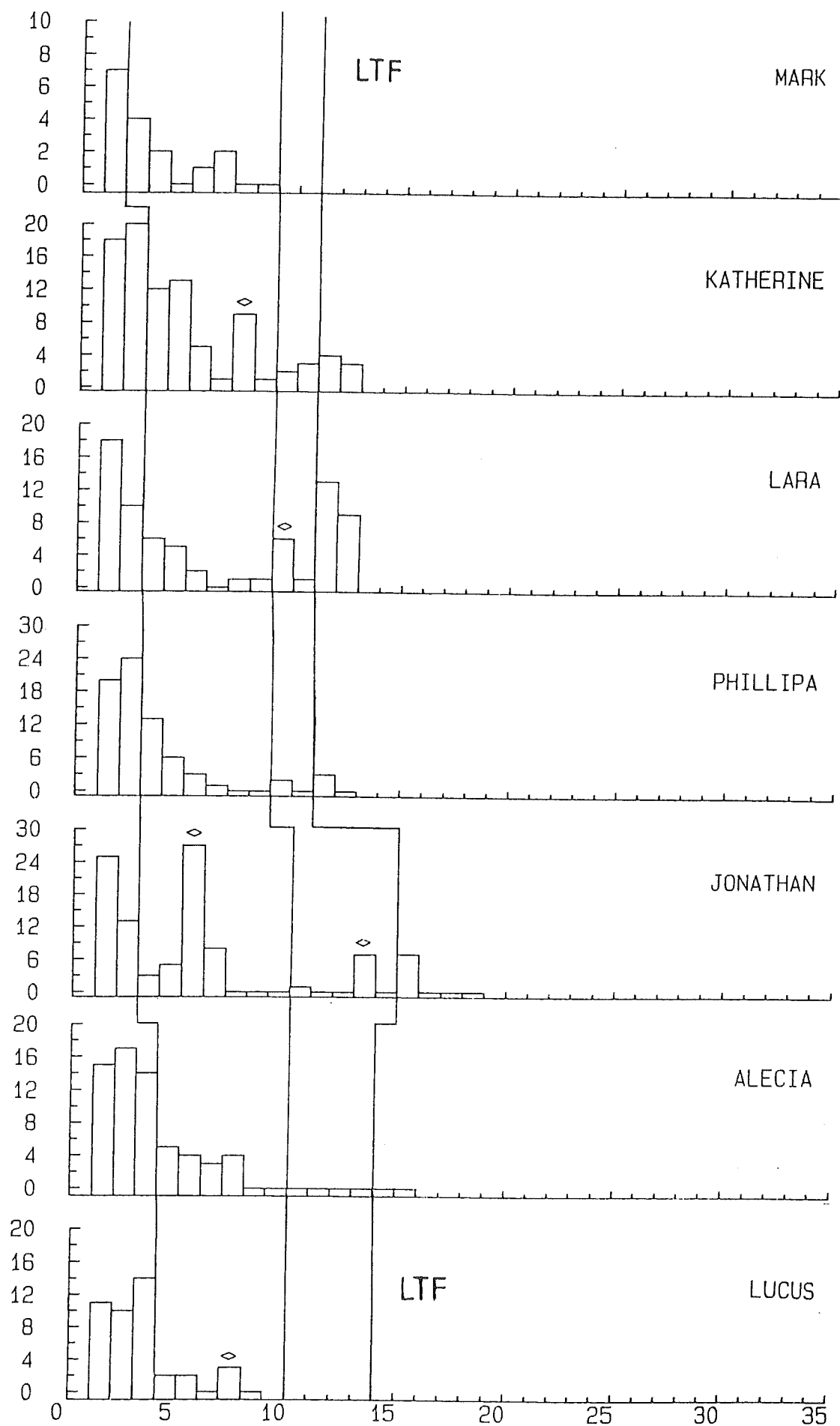
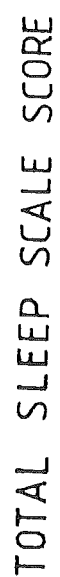
◇ = Sickness

V = Sleep medication was administered

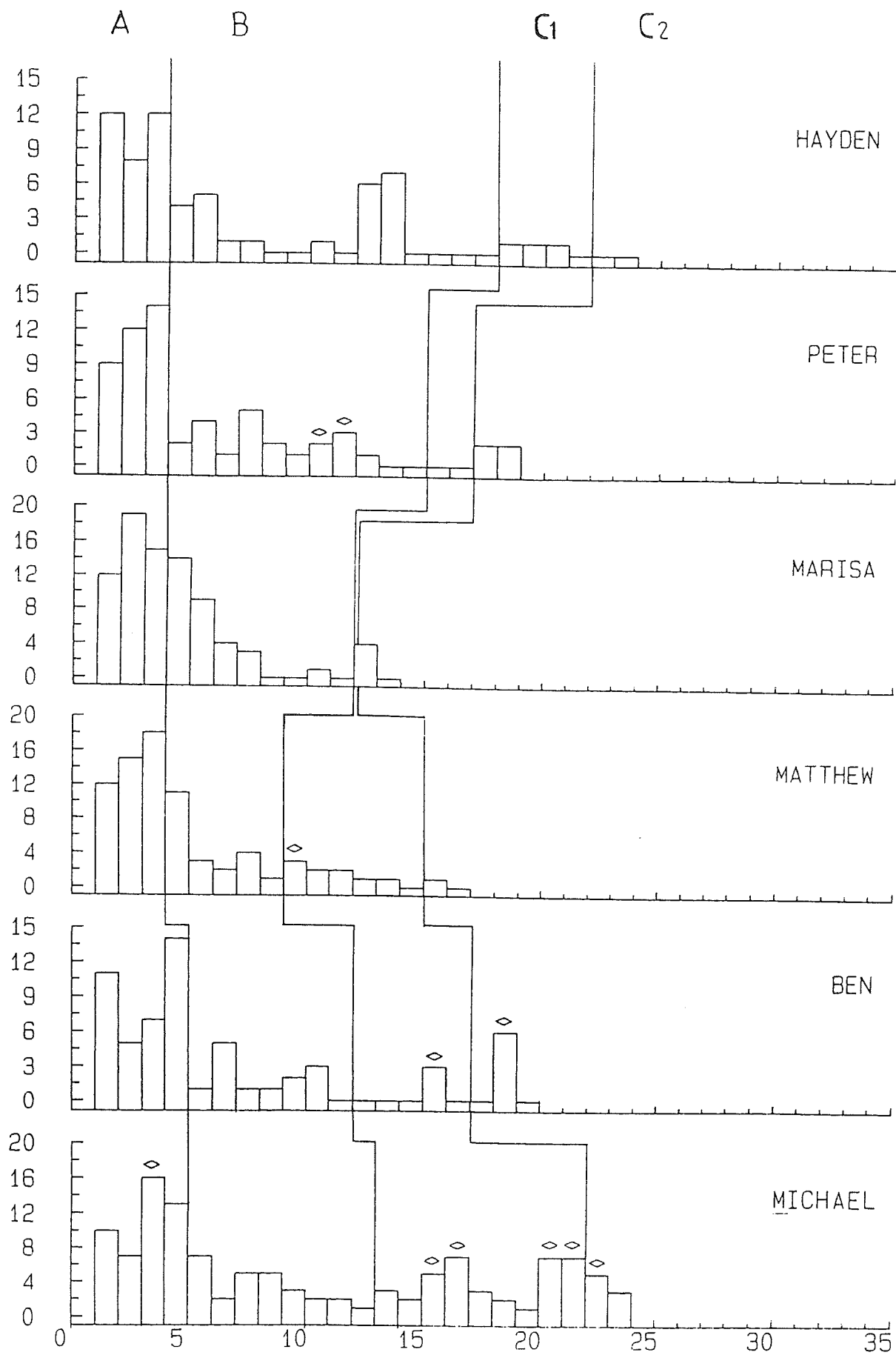
LTF

LTF

WEEKS



TOTAL SLEEP SCALE SCORE



WEEKS

nights awake per week did not vary less than 1 night per week. During baseline three children woke once per night; six children woke twice per night, and four children woke three or more times per night

After the introduction of treatment, Figure 2 shows the decline in wakings across all children. Hayden was the only child who exhibited an effect similar to a spontaneous recovery (Kazdin 1984). Figure 2 shows the consequent delay in treatment control as parents attended their sick child; as is seen with Jonathan, Peter, Matthew, and Michael. Treatment was extended for Hayden, Peter and Micheal who demonstrated a lack of treatment control after six weeks. The reduction of night-wakings was significant using a repeated measures T test. Comparison between baseline and the last two weeks of treatment showed night-waking was significantly reduced,  $t(12) = 27.0$ ,  $p < .001$ . Comparison between baseline and six month followup showed treatment gains were maintained  $t(9) = 31.83$ ,  $p < .001$ . Comparison between baseline and 18 month followup showed treatment gains were maintained 18 months after treatment ceased,  $t(10) = 8.90$ ,  $p < .001$ .

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Insert Figure 2 about here  
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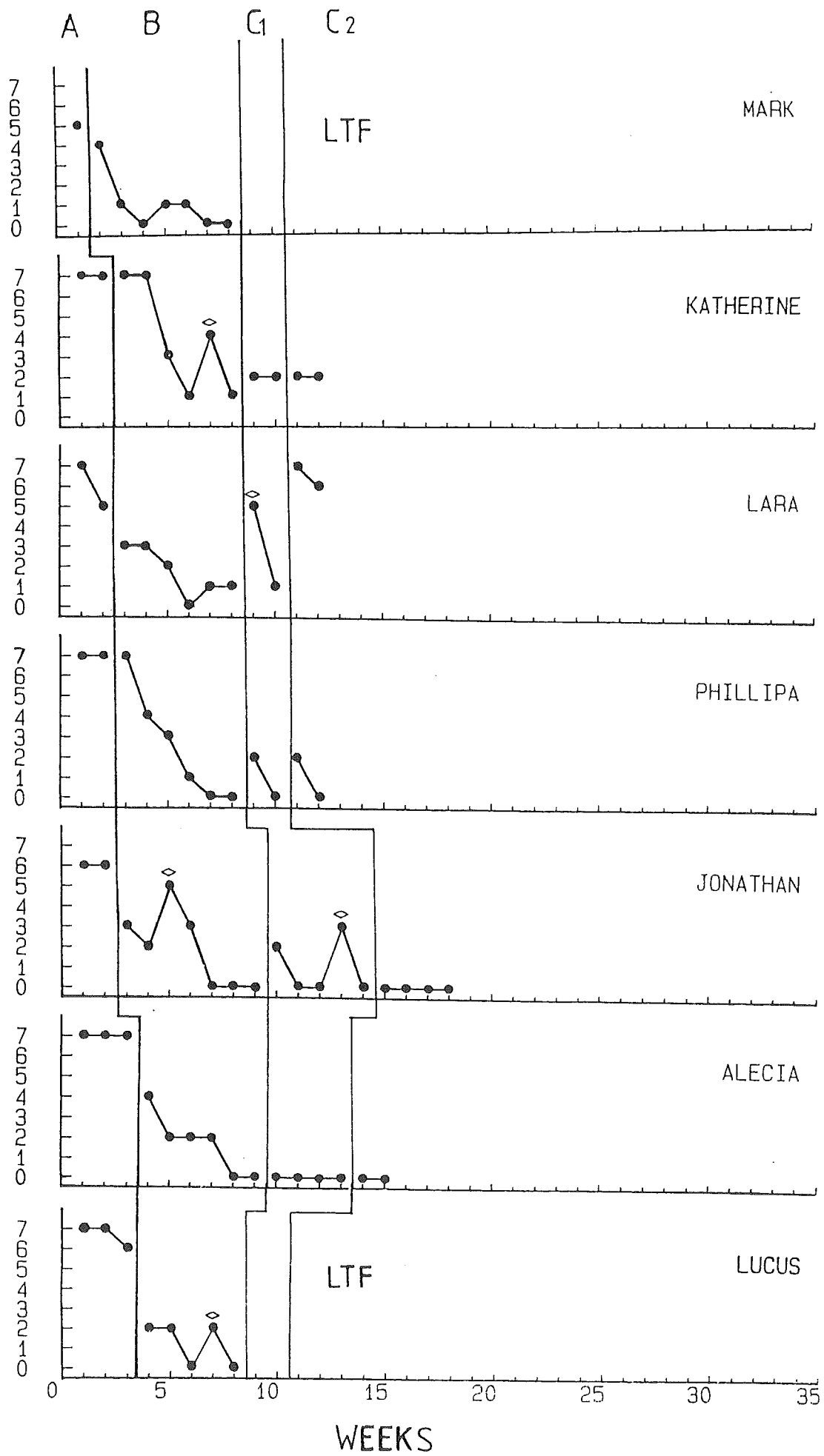


FIGURE 2. Night-waking by 13 infants across all experimental conditions in Experiment 1.

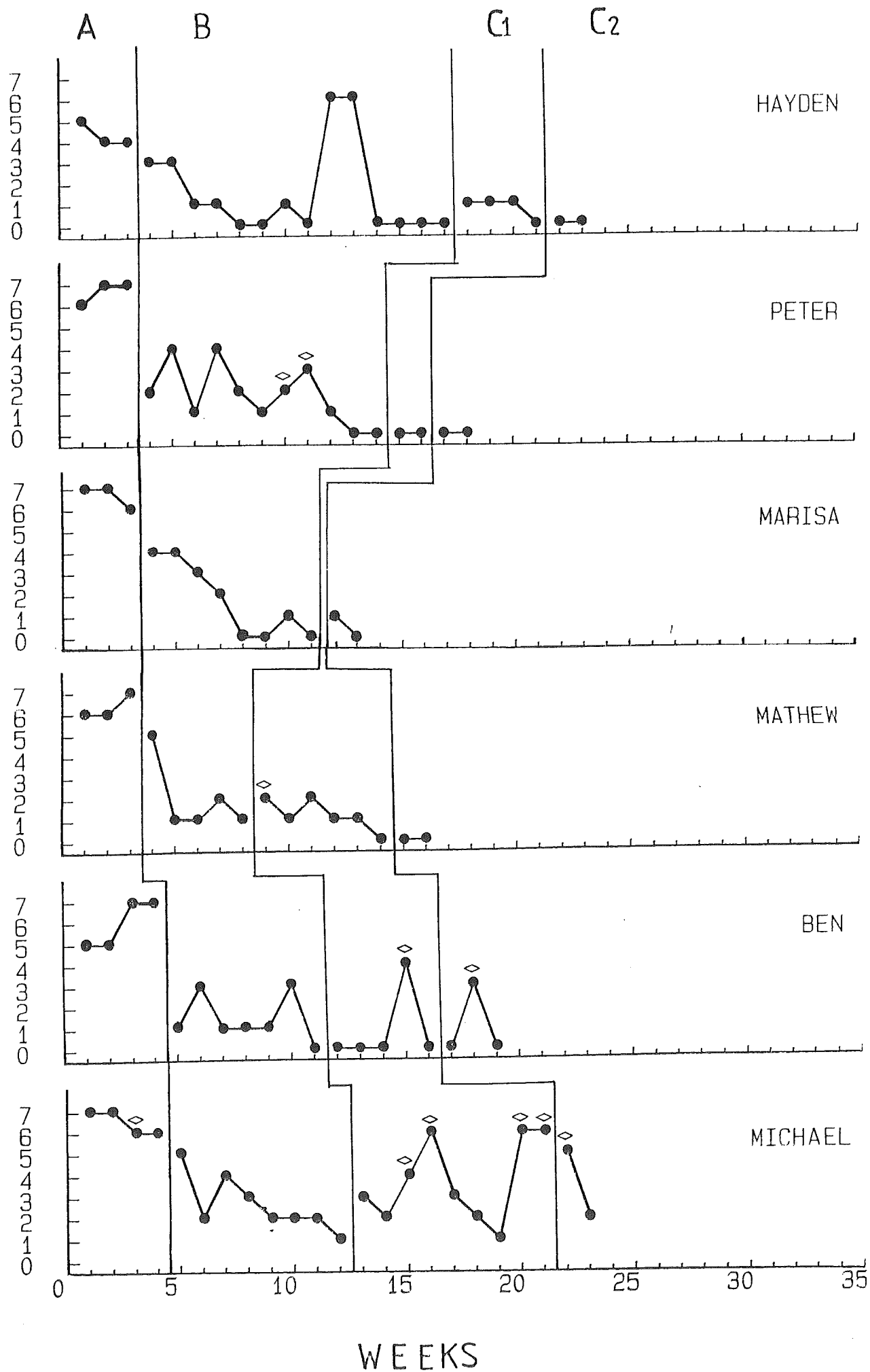
◇ = Sickness

V = Sleep medication was administered

NUMBER OF NIGHTS AWAKE



# NUMBER OF NIGHTS AWAKE



## DISCUSSION

This study found that a standard extinction programme can be effective in the reduction of sleep disturbance in infants. After 18 months 91% of infants (10/11) had maintained treatment gains across six outcome measures. Lara's relapse was due to nocturnal enuresis, not sleep disturbance. Two children were lost to 6 and 18 months followup.

Results of the night-waking outcome measure showed that eight infants averaged less than 1 waking per week during the 18 month followup, and two averaged less than 2 wakings per week. Moreover, parental daily diary recordings showed parents were attending appropriate child wakings only, i.e., due to sickness, or nightmares.

The disruption of the extinction programme because of sickness caused delays in most infant's development of a regular sleep pattern. This was demonstrated in five infants during various treatment and followup phases. Thus sickness or hospitalisation may hamper the establishment of a regular sleep pattern in some children, a finding previously noted in the literature (Beardslee, 1967; Bullard, 1980; Hagemann, 1981) and in etiology studies (Bernal 1973; Moore & Ucko 1957).

Six parents (46%) had previously used extinction one or more times without success. The previous failure of the extinction procedure suggests that professional support and reinforcement of parents' efforts provided in this study, especially in the early weeks of treatment, was an important part of the treatment procedure.

## Experiment 2

### EFFECTS OF EXTINCTION PLUS REINFORCEMENT PROCEDURES ON SLEEP DISTURBANCE IN PRESCHOOL CHILDREN.

This study had three aims. To combine extinction and reinforcement procedures in the treatment of four sleep disturbance behaviors: sleep onset latency, bedtime delay, night-waking, and sleeping in an inappropriate place. To evaluate the use of extinction plus contingent management of tokens in preschool children aged 2 to 5 years of age. To establish if treatment gains could be maintained by parents at 18 month followup, especially after the usual periods of sickness and holidays which disrupt children's sleep patterns (Bullard 1980; Hagemann 1981).

It was hypothesised that the extinction procedure would withdraw parental attention which was maintaining sleep disturbance, while the reinforcement procedure would enhance the likelihood of maintaining the appropriate bedtime and nighttime behaviors.

## METHOD

### Subjects and Setting

Twenty-two preschool children (13 males and eight females) between 2 and 5 years of age were assigned on a first come

alternating entry basis into either Experiment 2 (extinction plus reinforcement) or Experiment 3 (reinforcement alone). The longest outstanding baseline of Experiment 2 and 3 were filled alternately. Telephone referrals were assessed to ascertain suitability for entry into Experiment 2. Parent(s) of long baseline subjects were sent the booklet of daily diary recording sheets with an instruction sheet detailing how to record the dependent variables (see Appendix B). Daily diary recording by parents was a 24 hour record of the child's sleep and waking pattern. The inclusion criterion, waking definitions, behavioral measures and definitions, and diary recording sheets were the same as described in experiment 1.

#### Procedure

A multiple baseline across subjects design was used. Baseline criteria required (a) the washout of any sedative hypnotics. (b) Parents continued what ever interventions they were using, including the parental bed.

The treatment interview established the following criteria: (a) the child was free from illness, (b) no sleep sedatives were in current use, (c) the required baseline length was recorded, and (c) all other behavior programmes using tokens had been withdrawn. During the treatment interview baseline data sheets were collected, and parents were given a copy of the standardised extinction plus reinforcement programme (see Appendix D), a standardised

tokens (star) chart, and instructions on the use of the tokens chart (see Appendix E). Discussion usually followed from the the baseline recording sheets, of the need for new strategies e.g., what to do if the child kept getting out of bed, and how to encourage the child to put the stars on the chart. The session terminated with the agreement with the child(ren) and parents which range of small sweets (reinforcers) were to be given each morning. In addition, a demonstration was given of how to involve the child with the selection and placement of the multicoloured stars on the tokens chart.

Intervention. A standard extinction programme was used. The child was put to bed at a prearranged bedtime to suit each family routine. After the usual bedtime routine, parents showed the child the tokens chart and the sweets jar. The child was told of the contract to earn the tokens and sweets, and then put to bed. If the child cried out she/he was to be ignored. If the child got out of bed then the door was closed, the child was told she/he had lost the sweets, but that if she/he went to sleep a star would be given in the morning. Once the child stopped coming out of the room, parents were instructed to leave the door open contingent on the child proving that she/he would not leave the bedroom. If at any stage the parents were uneasy about the child's safety behind a closed door, they were to investigate if the child was in any difficulty. If so, they were to remedy the situation in a business-like manner with the hall light on,

minimizing any contact with the child, and leave the child's bedroom immediately.

If the child slept through the night, she/he was given a sweet from the jar of mixed sweets, and could select a star to put on the tokens chart. After two consecutive nights of no wakings the child could choose an extra sweet. After three consecutive nights of no wakings the child could select an extra sweet on the fourth morning. These contingencies continued until there were no wakings for one week. Social reinforcement of showing the tokens gained to family, grandparents, visitors, and neighbours was specifically programmed for in the handout and emphasised during the treatment interview (see Appendix E). Regular daily phone contact with all parent(s), or the child in some cases, was an important component of treatment during the first month; thereafter every three to seven days, or as required.

Maintenance . The criterion of three weeks of no wakings was used to move from the treatment to maintenance phase. This was decided upon experience from the infant programme, so as to reduce the possibility of relapse, and achieve a consistent change in sleep and waking pattern. When the child had reached the criterion parents were given a standard maintenance programme. Day 1 of maintenance phase; for every two stars give one reinforcer (a sweet) for the next 10 days. Day 11; for every three stars give one reinforcer (a sweet) for the next 15 days. Day 27; for every four stars give one



reinforcer (a sweet) for the next 20 days. Day 48; for every five stars give one reinforcer (a sweet) for the next 25 days. Day 74; for every six stars given one reinforcer (a sweet) for the next 30 days. Day 105; for every seven stars given one reinforcer (a sweet) for the next 35 days (see Appendix F). Maintenance was completed with (a) the withdrawal of the star chart from the view of the child, and (b) the child not ask for a star or sweets for three weeks.

Followup . Followup data was collected 18 months after treatment ceased.

#### Structured Interview

The structured interview was part of the assessment procedure. In 59% of cases (13/22 children) the first child was presented as the child with a sleep disturbance problem. In addition to these 13 children, six were second-born children, and the three remaining children were the last child of three-to-seven child families.

Ten children were referred by public health professionals, five children were referred from a radio programme about the research programme at the University, five referrals came from notices at kindergartens and play centres (see Appendix A), one child was referred by her physician, and one child came in to the study from the parent reading a press article about the controversy surrounding the sleep programme (see Appendix I).

Twenty children were from two parent families, two children were from single-mother families.

The mean age of the preschool children was 33.5 months and ranged from 24 to 58 months. Fourteen of the 22 children (63%) presented sleep onset latency and bedtime delay, and eight children (36%) presented night-waking problems only. Twenty of the 22 children (90%) slept during the day. Sixteen parents (73%) managed night-wakings by having their child in the parental bed. Nine of these 16 parents (56%) returned the child to their own beds once asleep, seven (44%) let the child remain in their bed for the rest of the night. Four parents reported difficult pregnancies, while 11 reported normal births. Eight children were induced, one was a caesarian birth, and three were by forceps delivery. Of these 11 difficult births, five mothers were given Pethadene, five an epidural analgesic, and one nitrous oxide. Fifteen (68%) parents reported a bad sleep and waking pattern from birth.

Ten children were bottle-fed and 12 breast-fed from birth to 18 months. Eighteen parents described their children as always busy, always on the go, in comparison with other children of their age, and seven parents said this created discipline problems in the home. Two children had eating problems.

Past management techniques for sleep problems included the use of sleep sedatives. Seventeen (73%) parents had tried them: one had used Pryndette (Paracetamol and Doxylamine Succinate), six used Phenergan (Promethazine hydrochloride),

five used Vallergan, and five used Vallergan Forte (Trimeprazine Tartrate). Six children were still being given sleep sedatives: one Phenergan, two Vallergan, two Vallergan Forte, and one child was given Seranace (Haloperidol) - a tranquiliser antipsychotic and antianxiety agent. Three parents had used extinction. Most used a combination of sedatives, parental bed, and parental attention for sleep disturbance behaviors.

#### Reliability

Reliability equipment and event-by-event calculations were the same as Experiment 1 except that a criterion 25% of each baseline length was the minimum reliability probe. Nine of the 22 children (40%), including at least one child from each baseline length, were probed for reliability checks in experiment 2. Table 8 shows the individual percentage agreement between parental diary recordings and the Esterline Angus bedroom recordings during baseline and treatment phases.

The mean baseline probe was eight nights - 27% of baseline length. Eric was the only subject the criterion reliability was not met. The mean baseline agreement between the probe and diary recording was 33%, the range was 0 - 66%,

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Insert Table 8 about here  
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Table 8

Percentage agreement between parental recordings and

reliability probes across baseline and treatment phases

Name	Percent baseline length	% Agreement diary & probe	Length of treatment probe	% Agreement diary & probe
-----				
2 weeks baseline				
Ben	50% (7 days)	43%	14 days	43%
3 weeks baseline				
Eric	14% (3 days)	66%	20 days	55%
4 weeks baseline				
Ben	32% (9 days)	33%	21 days	29%
Kai	43% (12 days)	42%	16 days	100%
5 weeks baseline				
Lorie	31% (11 days)	27%	17 days	18%
6 weeks baseline				
Jason	33% (14 days )	33%	16 days	child tampered with equipment unuseable data
7 weeks baseline				
Salena	27% (13 days)	0%	9 days	33%
Rachael	14% (7 days)	29%	18 days	50%
Robyn	8% (4 days)	25%	24 days	83%
-----				

and median agreement was 29%. Treatment reliability probes were usually better than baseline probes. The duration of treatment probes was nine to 24 nights (mean 19.5), with a mean percentage agreement of 51% (range 18 - 100%, median 50%).

## RESULTS

### Composite Sleep Scale

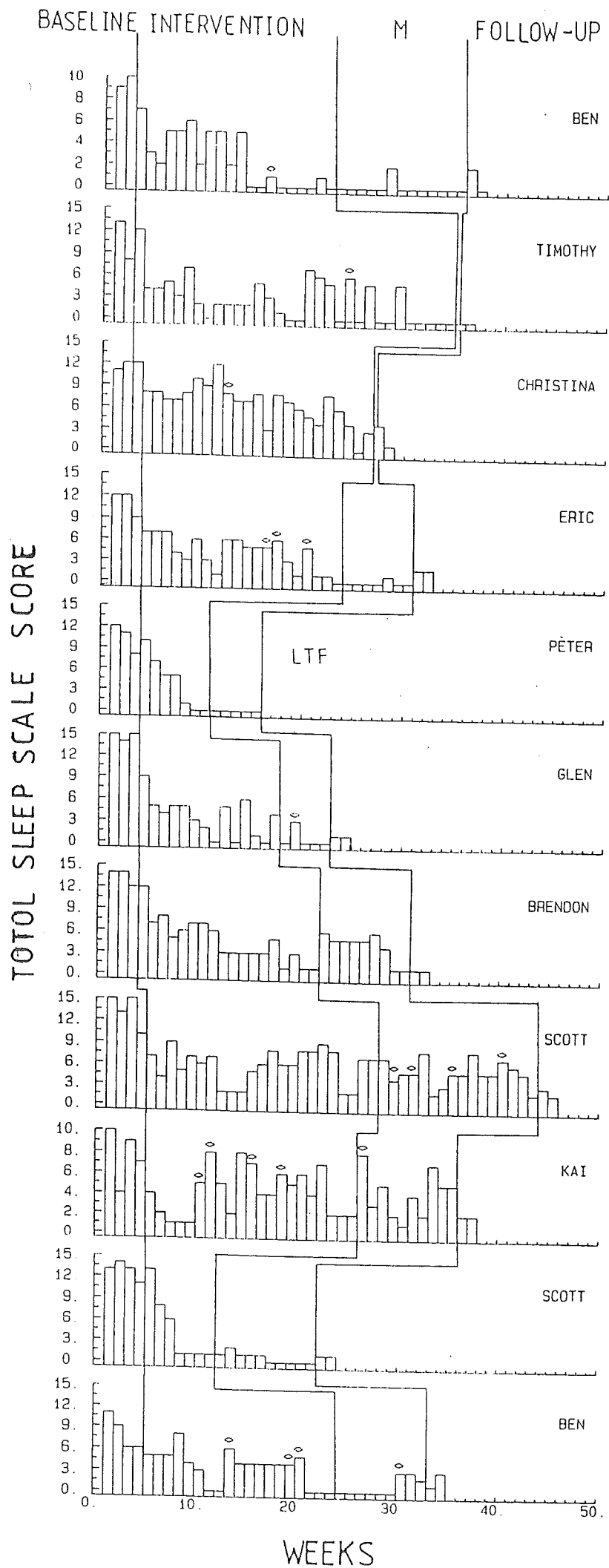
Figure 3 shows the composite sleep scale scores per week across baseline, treatment, maintenance and 18 month followup. Figure 3 shows that none of the children were in the acute range of severity (18-24) of this scale. Ten children were within the severe range (11-17) of the scale and 12 children were within the moderate range (5-10). All children remained within their range of severity during baseline. With the introduction of treatment procedures a decline in sleep scale scores is evident. Treatment was often delayed by periods of illness (marked as  $\diamond$  in Figure 3). The mean treatment phase length was 15 weeks (median 14 weeks). There was no relationship between severity and the length of the treatment phase i.e., the time taken to achieve the criterion of three weeks of no wakings  $r(18) = .2925, p = < .20$ .

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Insert Figure 3 about here  
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FIGURE 3. Composite sleep scale scores of 22 preschool children across all experimental conditions in Experiment 2.

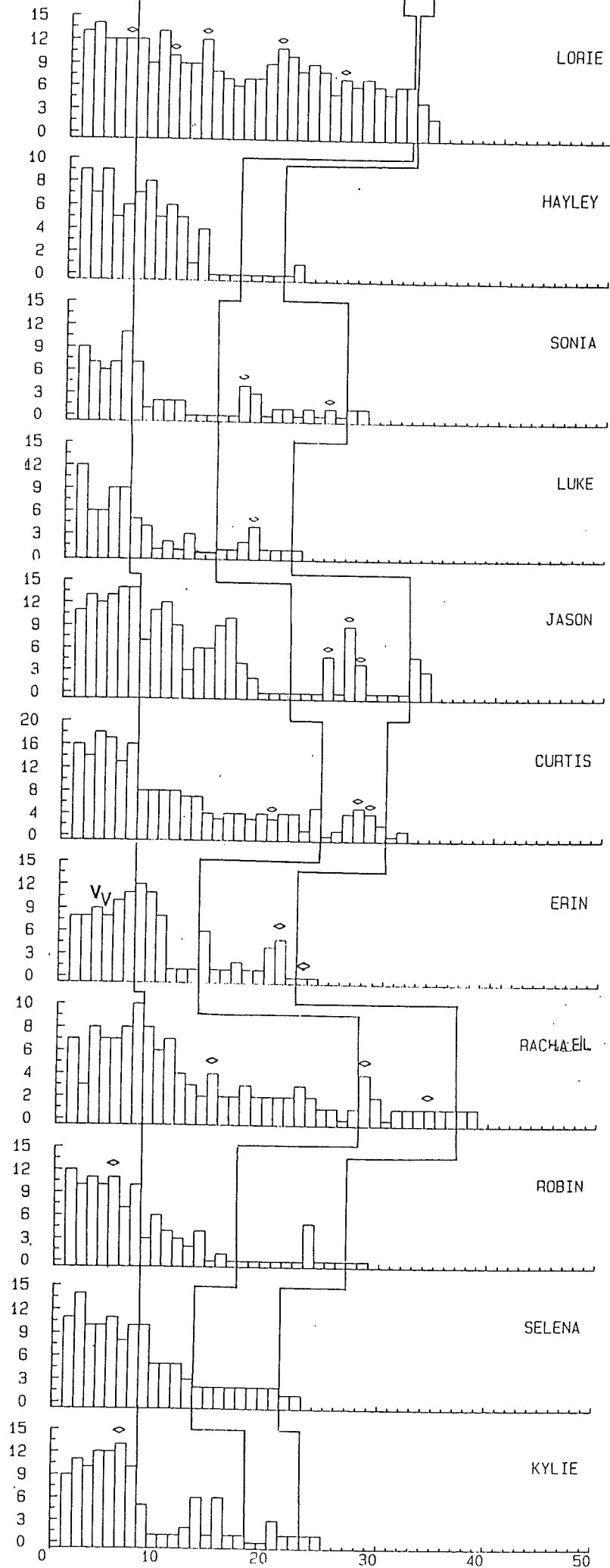
◊ = Sickness

V = Sleep medication was administered



# TOTAL SLEEP SCALE SCORE

BASELINE INTERVENTION M FOLLOW-UP



WEEKS



Lorie and Christina were the only children who did not reach the treatment termination criterion of 3 weeks of no wakings for change to the maintenance programme. Curtis entered the maintenance programme with a composite sleep scale score of 6, Lorie and Scott entered with scores of 7. Timothy did not begin the maintenance programme because his parents withdrew the tokens before he reached the treatment termination criterion. Nineteen children completed the maintenance programme within the slight range of severity (0 to 4) on the composite sleep scale. Maintenance phase scores remained within the slight range, except for Kai who relapsed with a score of six. Followup 18 months after treatment shows that 21 children were within the slight range of severity on the composite sleep scale with a mean score of 1. Peter was lost to followup (LTF).

#### Number of Night-Wakings

Figure 4 shows the number of night-wakings per week during baseline, treatment, maintenance, and 18 month followup. During baseline, 12 children woke an average of once per night, three children woke two times per night, six children woke three times per night, and one child woke four times per night. Erin's parents used Vallergan during weeks three and four of baseline. The drug reduced the number of wakings, but Erin returned to her regular pattern of waking twice each night. Sixteen children reached the treatment

termination criterion of three weeks of no wakings. Three children, Curtis, Brendon, and Scott, managed only two weeks of no wakings. Lorie and Christina, while achieving reduced number of night-wakings, could not reach the criterion of two weeks of no night-wakings. Timothy was the only other child who did not progress to the maintenance programme because his parents withdrew the tokens suddenly. Figure 4 shows relapse was not indicated.

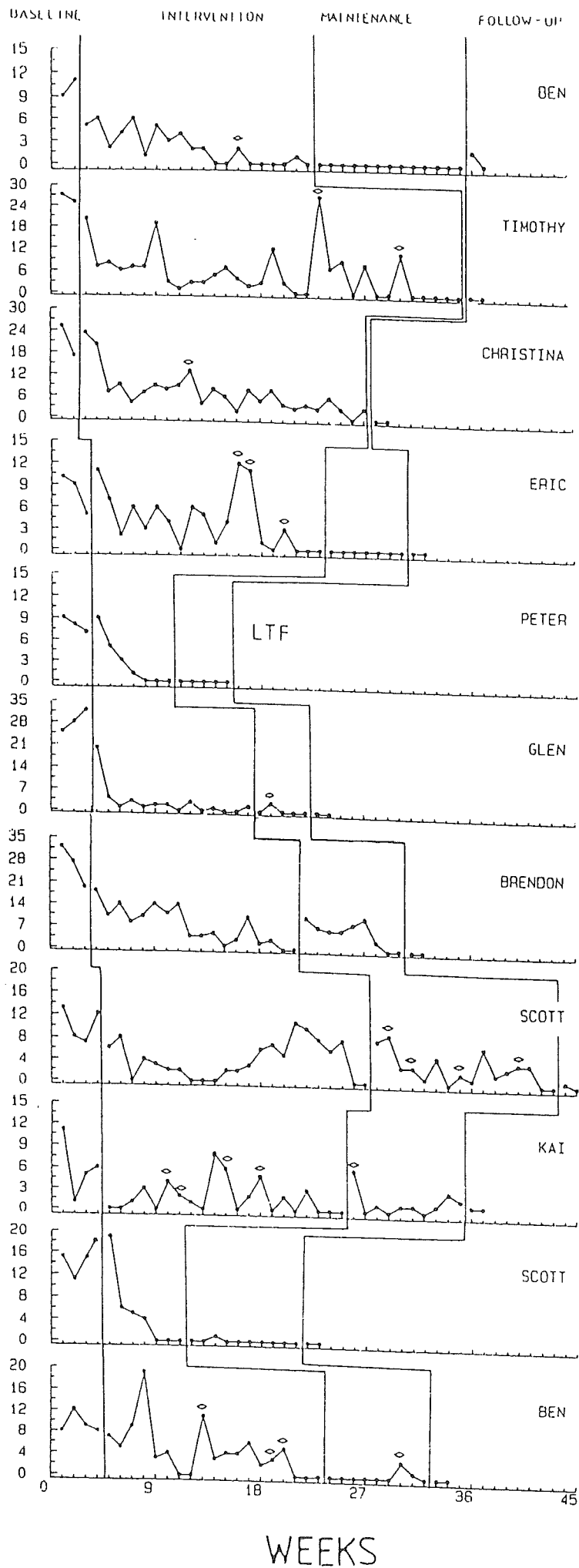
Maintenance of treatment gains without tokens and sweets was completed by 19 children. Sickness was the predominant factor for the increase in wakings. Two weeks followup of 21 children, 18 months after treatment ceased, showed that 95% of parents had maintained treatment gains. Peter was the only child lost to followup (LTF).

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Insert Figure 4 about here  
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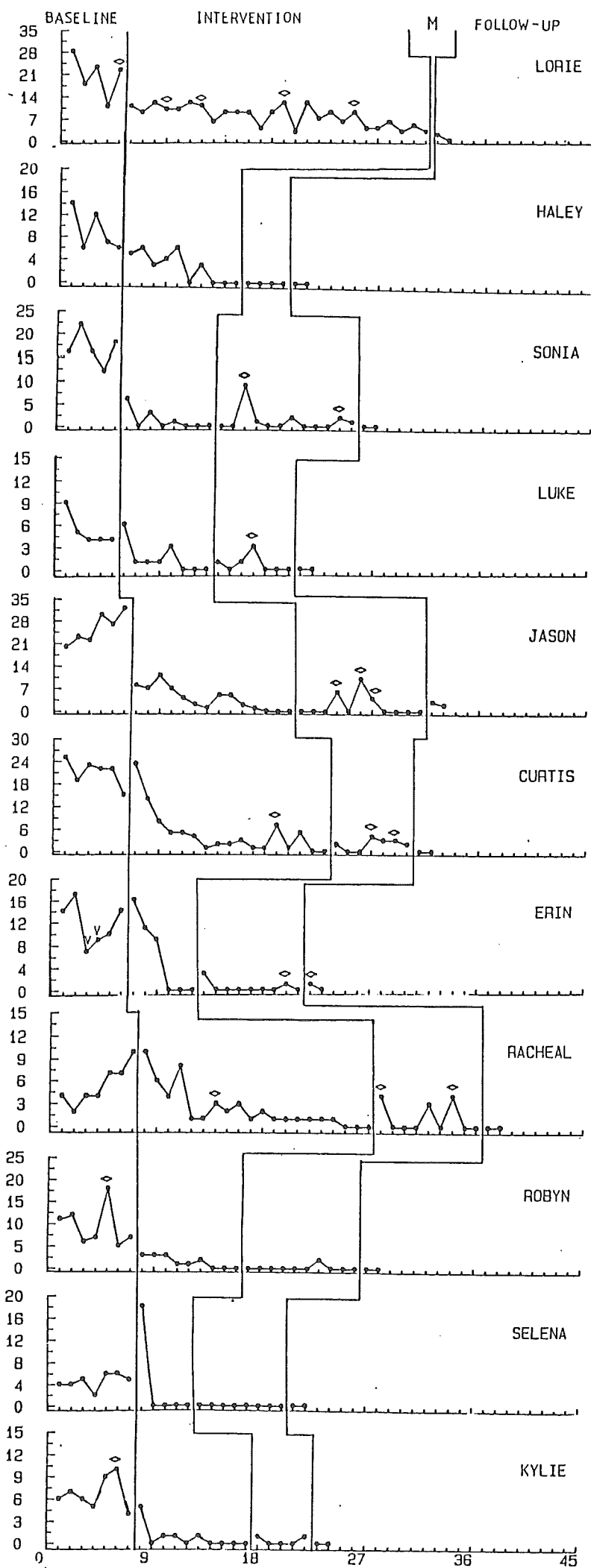
### Discussion

This study showed that extinction plus reinforcement procedures can be effective in reducing sleep disturbance in preschool children. Treatment data showed that 19 children (86%) reached the treatment to maintenance criterion. Followup 18 months after treatment had ceased showed that

# NUMBER OF TIMES AWAKE



# NUMBER OF TIMES AWAKE



WEEKS

FIGURE 4. Night-waking by 22 preschool children across all experimental conditions in Experiment 2.

◇ = Sickness

V = Sleep medication was administered

treatment gains had been maintained by 21 children, with one child lost to followup.

Baseline night-waking data indicated parental intervention was between one and four times per night. However, none of the children were within the acute range of severity in Experiment 2.

Compliance to treatment and maintenance procedures was perhaps due to specific programming for the support of parents as behavior modifiers, detailed handouts at the beginning of each procedure, and the minimising of parents introducing intermittent schedules of reinforcement e.g., responding appropriately to illness. The structured interviews suggest that previous failures of extinction was perhaps due to the lack of support in the early weeks of treatment. The effectiveness of the 3 weeks of no wakings treatment to maintenance criterion, and the benefits of daily diary records, are issues which may require further investigation.

### Experiment 3

#### EFFECTS OF REINFORCEMENT ONLY PROCEDURE ON SLEEP DISTURBANCE IN PRESCHOOL CHILDREN.

This study aimed to evaluate the efficacy of a reinforcement procedure in the treatment of four sleep disturbance behaviors in a sample of 22 two to five-year old children: sleep onset latency, bedtime delay, night-waking and sleeping in an inappropriate place. Secondly, the study sought to establish if treatment gains could be maintained by parents at 18 month followup especially after the usual periods of sickness and holidays, which are said to disrupt childrens' sleep patterns (Bullard 1980; Hagemann 1981). In all respects Experiment 3 was the same as Experiment 2 except for the treatment procedure.

### METHOD

#### Subjects and Setting

Twenty-two preschool children (12 males and nine females) between 2 and 5 years of age were assigned on a first come alternating entry basis into either Experiment 3 (reinforcement alone) or Experiment 2 (extinction plus reinforcement). One child was withdrawn for the study because he was not typical of the Experimental population; he had severe night terrors and

sleep disturbance. Two children, Lysandra and Dean were withdrawn during treatment. Lysandra because her mother was hospitalised for treatment of anorexia nervosa. Lysandra was replaced by the next referral. Dean's parents withdrew him from the study after little improvement. His parents would not consider using the extinction plus reinforcement procedures.

#### Procedure

A multiple baseline across subjects design was used. All inclusion criterion, recording the use of sedatives, interview procedures, and treatment criterion, and use of social reinforcement were the same as in Experiment 2.

Intervention. A standard reinforcement programme was given to parent(s). The child was to be put to bed at a prearranged bedtime to suit the family routine. After the usual bedtime routine, parents showed the child the tokens chart and the sweets jar. The child was told of the contract to earn the tokens and sweets, and was then put to bed. If the child got out of bed the child was told she/he had lost the sweets, but that if she/he went to sleep a star would be given in the morning. If at any stage the parents were uneasy about the child's safety they were to investigate if the child was in any difficulty. If so, they were to remedy the situation in a business-like manner with the hall light on,



minimizing any physical or verbal contact, and leave the child's bedroom immediately. If the child slept through the night, she/he was given a sweet from the jar of mixed sweets, and given a token to put on the star chart.

A major problem for many parents in Experiment 3 was the child coming out of the room. The procedure used in Experiment 3 was similar to the procedure for out-of-bed behavior used effectively by the parents of an autistic child for the treatment of sleep onset latency (Wolf, Risley, & Mees 1964). If the child came out of the bedroom the child was told she/he had lost the sweet and was told the door would be closed if the child came out again. The child was also told that if they went to sleep they could earn a star in the morning. If the door was closed it was reopened once the child was asleep. Unlike the extinction procedure the door was not closed through the night.

Maintenance and Followup. The treatment termination criterion, maintenance phase, maintenance programme, and collection of 18 month followup data was the same as for Experiment 2.

#### Structured Interview

The structured interview was part of the assessment procedure and identified some variables which are peculiar to this population. In 57% of cases (12/21 children) the first

child was presented as the child with a sleep disturbance problem. In addition to these twelve children, eight second born children accounted for 20 of the 21 (95%) children in Experiment 3.

Eight children were referred by public health professionals, two children were referred from a radio programme about this study at the University, seven referrals came from notices at kindergartens and play centres (see Appendix B), one child was referred by her pediatrician, and four children came into the study after the parent had read a press article about the controversy surrounding the sleep programme (see Appendix I). Twenty children were from two parent families, one child was from a single mother families. The mean age of the preschool children was 36 months, their ages ranged from 21 to 55 months. Fifteen of the 21 children (71%) presented sleep onset latency, bedtime delay, and eight children (38%) presented night-waking problems only. Eight of the 21 children (38%) required day sleeps. Eleven parents (52%) managed night-wakings with the use of the parental bed. Eight of the 11 parents (72%) returned the child to their bed once asleep, three parents (25%) let the child remain in their bed for the rest of the night. Seven parents reported difficult pregnancies, while 15 reported normal births. Seven children were induced, three were caesarian births, and one was by forceps delivery. Of these difficult births two mothers were given an epidural. Sixteen parents (76%) reported a bad sleep and waking pattern from birth.

Eleven children were bottle-fed, and eleven were breast-fed from birth to 18 months. Nineteen parents described their children as always busy, to always on the go, in comparison with other children their age. Nine parents said this created discipline problems in the home, and one child had eating problems.

Past management techniques of sleep problems included the use of sleep sedatives. Eighteen parents (81%) had tried them: two Pryndette (Paracetamol and Doxylamine Succinate), eight Phenergan (Promethazine hydrochloride), four Vallergran, and four Vallergran Forte (Trimeprazine Tartrate). Six children were currently administered sleep sedatives - one Phenergan, four Vallergran, and one Vallergran Forte. One family had attempted the extinction procedure. Most used a combination of sedatives, parental bed, and parental attention for sleep disturbance behaviors.

### Reliability

Reliability equipment, and event-by-event calculations were the same as Experiment 2. Nine of the 21 children (42%), including at least one child from each baseline length, were probed for reliability checks in Experiment 3. Table 9 shows the individual percentage agreement between parental diary recordings and the Esterline Angus bedroom probe during baseline and treatment phases. The mean baseline probe was eight nights - 29% of baseline length. Dean was the only

who did not achieve the criterion number of reliability checks since his parents asked that the reliability checks equipment be removed during baseline because it appeared to keep Dean awake. The mean baseline agreement between the probe and diary recording was 28%, the range was 0 - 75%, and the median agreement was 27%. Treatment reliability probes were usually better than baseline probes. The duration was 5 to 24 nights (mean 12.0), with a mean percentage agreement of 54% (range 36 - 100%, median 40%).

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Insert Table 9 about here  
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## RESULTS

### Composite Sleep Scale

Figure 5 shows the composite sleep scale scores each week during baseline, treatment, maintenance, and 18 month followup. None of the children were in the acute range of severity (18-24) on this scale. Eight children were within the severe range (11-17) and 13 children were within the moderate range of severity (5-10) on this scale. All children remained within their range of severity during baseline. With the introduction of the treatment, a concomittant decline in

Table 9

The percentage agreement between parental recordings and reliability probes across baseline and treatment phases

Name	Percent baseline length	% Agreement diary & probe	Length of treatment probe	% Agreement diary & probe
-----				
2 weeks baseline				
Lysandra	35% (5 days)	0%	10 days	100% Withdrawn from study
3 weeks baseline				
Liam	33% (7 days)	29%	18 days	44%
Richard	19% (4 days)	25%	20 days	52%
Nicholas	29% (6 days)	17%	5 days	60%
4 weeks baseline				
Fleur	46% (13 days)	8%	11 days	36%
Elizabeth	39% (11 days)	36%	12 days	58%
5 weeks baseline				
Tania	31% (11 days)	45%	14 days	36%
6 weeks baseline				
Robin	29% (12 days)	75%	13 days	46%
7 weeks baseline				
Dea	8% (4 days)	25%	Machine woke - parents withdrew child from study	
-----				

sleep scale scores was observed. Treatment was often delayed by periods of illness (marked as  $\diamond$  in Figures 5). The mean treatment phase was 14 weeks (median 15 weeks). There was no relationship between severity and treatment length [ $r(20) = .1609$   $p < .51$ ]. Gregg was the only child not to reach the treatment termination criterion to begin the maintenance programme. Nineteen children completed the maintenance programme within the slight range of severity (0 to 4). Kai relapsed with a score of 6 on the composite sleep scale. Followup 18 months after treatment showed that 19 children were within the slight range of severity on the composite sleep scale, with a mean score of 1.6. Dale was lost to followup and Dean was withdrawn during treatment.

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Insert Figure 5 about here  
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#### Number of Night-Wakings

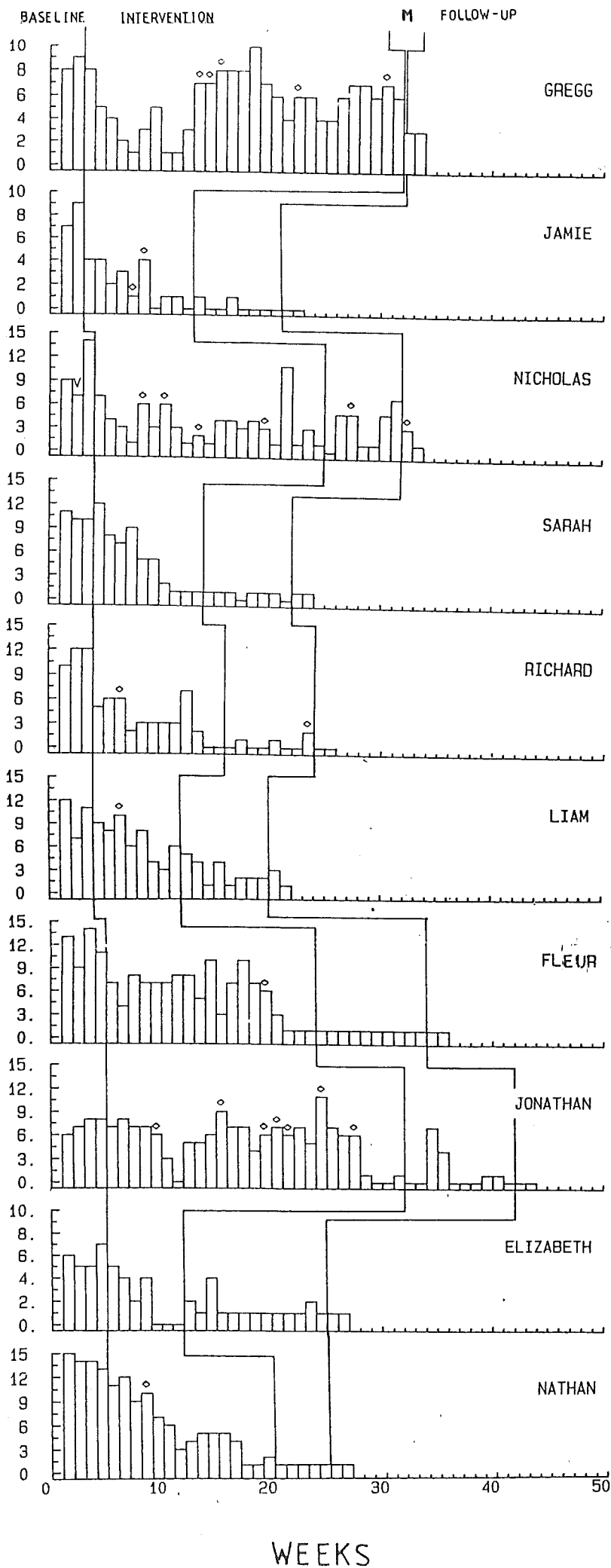
Figure 6 shows the number of night-wakings per week across baseline, treatment, maintenance and at 18 month followup. During baseline 12 children woke an average of once per night, nine children woke two times per night, and one child woke three times per night. Figure 6 shows that Nicholas' parents used Vallergran for one night during week two of baseline. Nineteen children met the criterion for

FIGURE 5. Composite sleep scale scores of 21 preschool children across all experimental conditions in Experiment 3.

◇ = Sickness

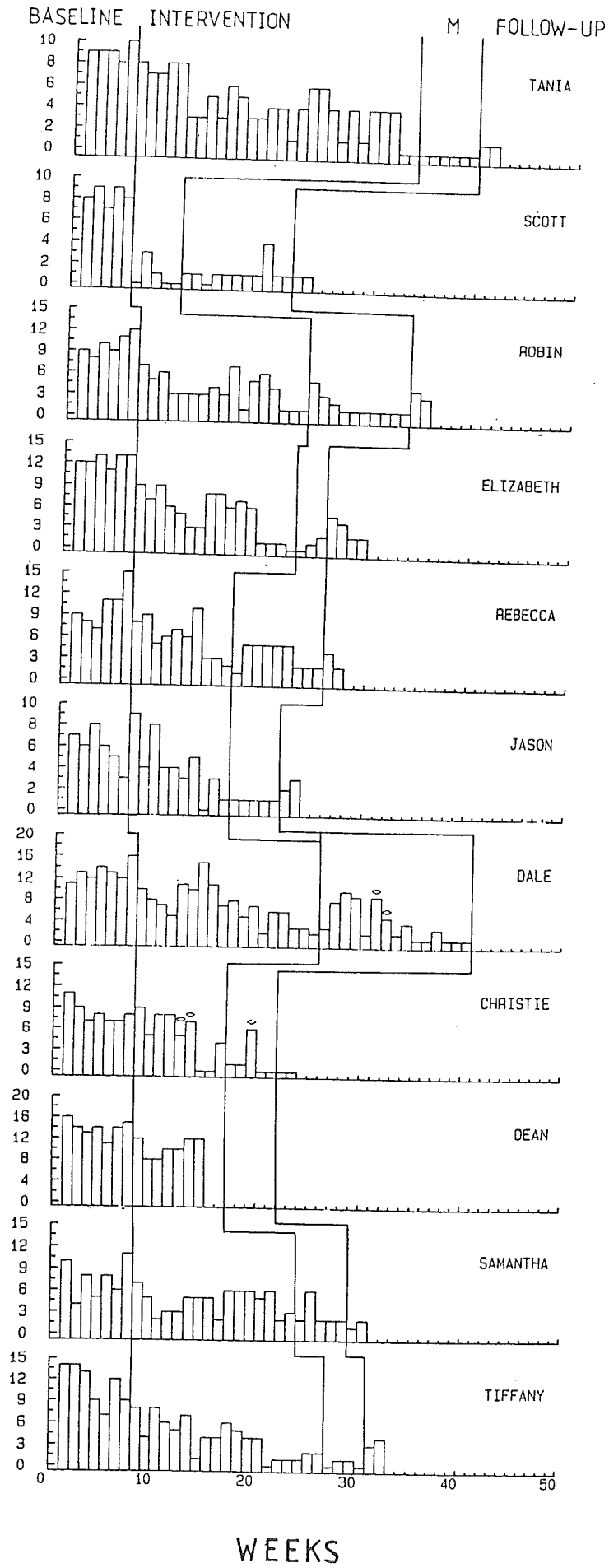
V = Sleep medication was administered

# TOTAL SLEEP SCALE SCORE





TOTAL SLEEP SCALE SCORE



inclusion in the maintenance programme. Gregg was the only child who could not achieve more than one week of no night-waking. Maintenance of treatment gains without tokens and sweets was completed by the other 19 children. Sickness was the predominant factor for the increase in wakings. Two weeks followup of 19 children, 18 months after treatment, showed that 84% of the children (16/19) had maintained treatment gains. Dale was the only child lost to follow-up.

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Insert Figure 6 about here  
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#### DISCUSSION

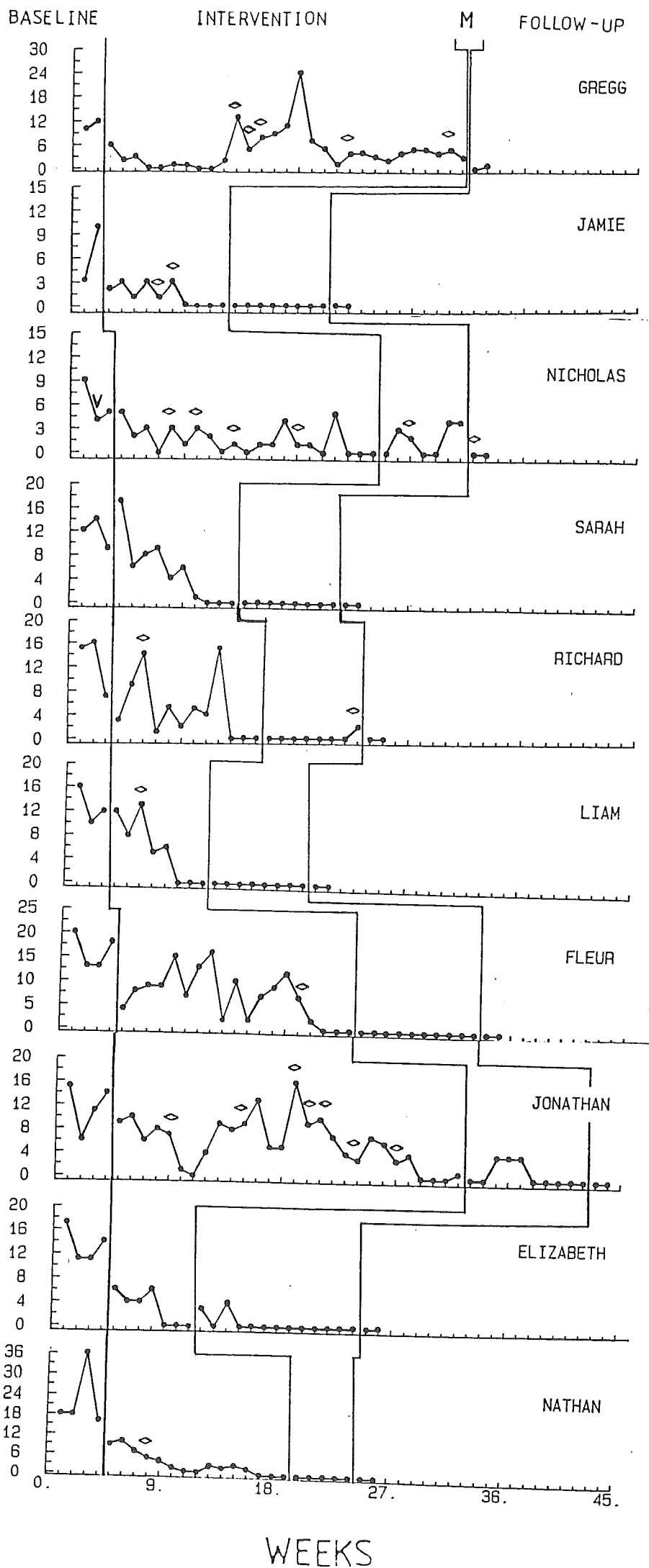
This study found that reinforcement only can be an effective procedure for reducing sleep disturbance in preschool children. Data on the six outcome measures of the composite sleep scale indicated that 85% of children (18/21) were within the slight range of severity at the beginning of the maintenance programme. One child was withdrawn from the study by his parents during treatment. During the maintenance programme sickness, accompanied by appropriate parental attention at that time, hampered the phasing out of reinforcement. Followup 18 months after treatment showed that 90% of children were within the slight range of severity of the composite sleep scale.

FIGURE 6. Night-waking by 21 preschool children across all experimental conditions in Experiment 3.

◇ = Sickness

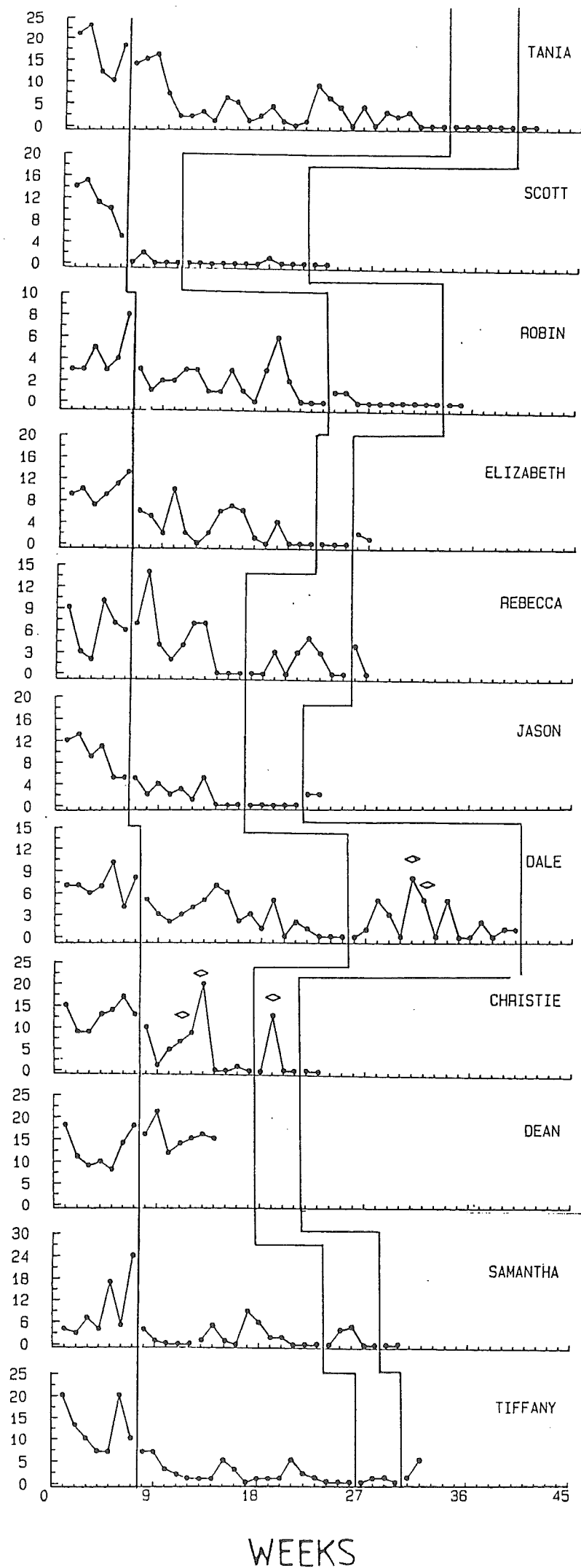
V = Sleep medication was administered

NUMBER OF TIMES AWAKE



# NUMBER OF TIMES AWAKE

BASELINE INTERVENTION M FOLLOW-UP



WEEKS

Baseline night-waking data indicated parental intervention was between one and three times per night. However, none of the children were within the acute range of severity on the composite sleep scale. The withdrawal of reinforcement after treatment showed one child (Kai) relapsed to within baseline levels of night-waking. Seventy-eight percent of children (i.e., 15/19), did not wake during followup. Two children (11%) woke, on average, less than 2 nights per week and the other two children (11%) woke, on average, less than 3 nights per week. It should be noted that parents were not attending to the child other than for appropriate reasons. However, if a parent attended a child the composite sleep scale included any parent intervention as one of the dependent variables during baseline, treatment, maintenance and followup phases.

## General Discussion

This study, in three experiments, investigated if behavioral intervention was effective, using extinction, extinction plus reinforcement, and reinforcement alone, for sleep disturbance with infants and preschool children. And if treatment gains could be maintained 18 months after treatment ceased.

In Experiment 1, the extinction procedure showed it can be effective for the reduction of sleep disturbance in infants. Treatment of 4 sleep disturbance behaviors was 100% effective. All 13 infants were within the slight range of severity (0-4) on the composite sleep scale at the end of treatment. Followup 6 months after treatment ceased showed that all 10 children whose parents recorded followed up data (100%) were within the slight range of severity. At 18 months followup, 10 of the 11 children whose parents recorded followed up data (91%) had maintained treatment gains across six outcome measures: the mean severity score was 2.3 (range 0-13). One child's relapse was due to nocturnal enuresis not sleep disturbance behaviors. Two children were lost to 6 and 18 months followup.

Seymour et al (1983b) used a group design to demonstrate the extinction curve. Experiment 1 using the A B multiple baseline design shows in Figures 1 and 2 the extinction curve for night-waking, and with the 6 outcome measures of the

composite sleep scale. However, comparison between baseline night-waking and composite sleep scale scores showed different trends. This was readily apparent during baseline for Jonathan, Hayden, Ben, and Michael. During treatment Hayden and Michael returned to baseline levels of night-waking but composite sleep scale scores indicated a reduction in their sleep disturbance. This is because the use of six outcome measures, including night-waking, gives the investigator more complete data of the frequency, duration and intensity of sleep disturbance behaviors. These differing trends supports suggestions by Coates and Thoresen (1981), that the use of more than one outcome measure, besides night-waking, is desirable. The decision to collect data for the composite sleep scale in Experiment 1 also seems justified because comparison with composite sleep scale scores used in recent treatment outcome studies is possible (Lawton 1985; Richman 1981b; Richman 1985a; Richman et al 1985b).

Experiment 1 also extends the application of extinction, as previous studies using the extinction procedure have treated children from 1 year of age (Seymour et al 1983b; Williams 1959; Wolf et al 1964). The treatment of 6 month old children may therefore reduce the detrimental effects of sleep disturbance. Early intervention may also encounter less resistant behavior traps in younger infants with a limited repertoire of responses.

In Experiment 2, extinction plus reinforcement procedures were effective in the reduction of sleep disturbance behaviors



in 22 preschool children. At the termination of treatment, 19 children were within the slight range of severity (0-4) on the composite sleep scale, 1 child had a score of 6, and 2 children had scores of 7. Treatment gains were maintained across the six outcome measures during the maintenance programme. At 18 month followup, 21 children (95%) were within the slight range of severity with a mean of 1.3.

In Experiment 3, the reinforcement procedure was effective in the reduction of sleep disturbance in 21 preschool children. At the termination of treatment, 18 children were within the slight range of severity (0-4) on the composite sleep scale, 2 children had scores of 7, and 1 child was withdrawn by his parents. During the maintenance programme only one child relapsed with a score of 6. At 18 month followup, 19 children (90%) were within the slight range of severity with a mean severity score of 1.6.

The withdrawal of one child from the reinforcement only procedure, and the refusal of parents to use extinction demonstrates that the extinction procedure requires acceptance by both the clinician and parent(s). The effectiveness of reinforcement only, in Experiment 3, will perhaps give clinicians more choice of treatment procedures for sleep disturbance in preschool children. Clinicians may opt for the reinforcement procedure, then introduce extinction if required. The progression to a more aversive contingency (i.e., extinction) should not present theoretical problems for the management of sleep disturbance. However, this may

require further investigation.

The efficacy of behavioral interventions for sleep disturbance can be explained by basic learning theory and analysis using the coercive behavior hypothesis. While the treatment programmes in Experiments 1 - 3 have many common aspects of these theories I shall discuss their particular relevance for each Experiment in turn.

The extinction procedure, used in Experiments 1 and 2, by definition no longer delivers the reinforcer for a previously reinforced response. Sleep disturbance, according to learning theory, has been shaped and maintained by conditioned reinforcers; usually administered by a parent. The removal of all reinforcers, including those given by parents, should result in the cessation of previously reinforced responses for night-waking, sleep onset latency, bedtime resistance, and sleeping in an inappropriate place. Figures 1 and 2 show the typical decline of sleep disturbance behaviors consistent with learning theory analysis (i.e., the extinction curve).

Extinction also elicits a response from the infant - usually crying, which may have been previously avoided, or aversive to parent(s). The coercive behavior hypothesis suggests that parents may have shaped behavior traps, and maintained response chains by removal, or avoidance of for example, crying. The continued avoidance, and or removal of aversive responses, such as crying at 2.00 a.m., may then account for the strengthening of parent-child response chains into behavior traps (e.g., bringing the infant into the

parental bed). The detrimental effects of sleep disturbance upon spouses, siblings, and the infant, reported by Chavin and Tinson (1980) and Richman (1981b), is perhaps evidence of the consequences of avoidance behavior, and how serious such behavior traps can develop. That is, marital disharmony may have begun from disagreement about bringing the infant/preschool child into the parental bed.

Reversal of behavior traps entailed the recording of overt parent and child responses to identify avoidance behaviors. Then to identify the strength of these behaviors for example, was the parental bed used. What was the frequency of its use? The duration - did the infant sleep part or all night in the parental bed, and what was the intensity of resistance or avoidance behaviors.

The modification of a previously aversive response was possible because of 4 factors. First, parents were required to identify what elicited the aversive response - crying. If possible this was explained to parents in behavioral terms.

Second, parents recorded and observed the predicted decline in the frequency, duration, and strength of crying or elicited behavior. This was an important factor in parental compliance to the treatment programme. The rapid cessation of aversive behaviors and expectation of a spontaneous recovery effect was also explained. From experience the spontaneous recovery effect (the reappearance of aversive responses to sometimes baseline levels) occurred 5 - 10 days after the introduction of treatment. Some parents had discontinued

extinction previously because of the spontaneous recovery effect, thinking that the procedure was not successful. The previous use of extinction had apparently failed because none of the parents had recorded the decline in aversive responses. Third, recording plus regular professional support were important factors in reinforcing parents as behavior modifiers. Finally, extinction showed rapid cessation of sleep disturbance behaviors because infants repertoire of responses were limited.

Extinction plus reinforcement procedures used in Experiment 2 were hypothesised to withdraw all conditioned reinforcers, usually given by parents, while reinforcement would enhance the likelihood of maintaining the appropriate bedtime and nighttime behaviors. The use of extinction for sleep disturbance in preschool children was effective for the reasons discussed above with infants in Experiment 1. However, the response repertoire of preschool children was greater. For example, during treatment parents had to sometimes put the child to bed after she/he was found asleep on the floor behind the closed door. The spontaneous recovery effect was also encountered by some parents.

The reinforcement of the child for appropriate bedtime and night behavior with tokens constantly displayed on a tokens chart was effective according to Richman (1981a; 1984; 1985b). The programming for social reinforcement, i.e., praise, showing the tokens gained to grandparents, relations, neighbours, and parents, appeared effective in maintaining

appropriate behavior after the predicted cessation of aversive responses from employing the extinction procedure. Parents were reinforced as behavior modifiers by recording the reduction in overt sleep disturbance behaviors.

The use of detailed handouts at the beginning of each phase may have clarified what was expected during each part of the programme. Encouragement and professional support given to parents for their successes from carrying out instructions, and consequent improvements were an incentive to continue the treatment and maintenance programmes. The reduction in aversive bedtime resistance behaviors, and or sleep onset latency, meant parent(s) could relax when the child was put to bed in the evening which for some parents was very reinforcing.

The reinforcement procedure used in Experiment 3 was hypothesised to enhance the likelihood of maintaining appropriate bedtime and nighttime behavior. The tokens chart bridged the problem of time delay between performance and reinforcement because it was on permanent display for the child to gain intermittent social reinforcement from others. After sleeping through the night the sweets, given to the child upon waking, acted as immediate reinforcement. No other programmes were in progress which used tokens or sweets to avoid satiation of these reinforcers, and so as not to confuse the child why they were receiving the reinforcer. Each night before bed the child was shown the contingent reinforcers (tokens and sweets) obtainable in the morning. Thus the

child was reminded of the relationship between appropriate behavior and reinforcement so as to enhance control. The child also learnt that by continuing to perform target behaviors (e.g., sleep through two or more nights concurrently) she/he could increase the positive reinforcement received and choose a second sweet. Thus according to learning theory, the reinforcement procedure and tokens, can gain control of target behaviors i.e., sleep onset latency, bedtime resistance, night waking, while enhancing the acquisition of appropriate bedtime and nighttime behavior.

The coercive behavior hypothesis predicts benefits from the reduction of behavior traps, and that positive treatment outcome may generalised to other behaviors. Followup of parents as behavior modifiers, the investigator received numerous anecdotal reports that children were more manageable. Seymour et al (1983a) also reported 75% of children (36/48) were more manageable during the day. Some generalisation to other behavior problems is consistent with the removal of behavior traps, especially with the removal of daytime sleep disturbance problems. Parents gaining confidence as behavior modifiers may have introduced other mean of reducing aversive child responses. Or they may have reduced inconsistent handling of aversive behaviors.

In summary, Experiments 1 - 3 have been effective because they were based on simple learning theory; the reduction of 6 target behaviors. The coercive behavior hypothesis, while based on learning theory assumptions,

can be used to analyse the possible development and maintenance of sleep disturbance. However, closer investigation of many parent-child responses similar to the study by Snow et al (1980) investigating crying episodes of infants in the first 26 months, or the study by Wahler and Dumas (1986) investigating stimulus control processes of escalating aversive coercive interactions between preschool and older children, would have to be undertaken before the coercive model could be better applied to sleep disturbance problems.

The accuracy of parent's diary recording is difficult to assess alone. The use of the Esterline Angus as an independent measure of night-time sleep and waking events has been used in previous infant sleep research (Coates & Thoresen 1981). The moderate reliability agreements from 437 night probes means reliability data can be considered as estimates only for two reasons. First, probes were taken during phases when target behavior occurred at high rates, i.e., during baseline and the first weeks of treatment. Second, sources of inaccuracy were highlighted in this study, e.g., the ink dried up or ran out, the pen became blocked, and because the Voice Activator Relay could not be locked into position, it became an easy target for children to alter the individually tested setting for each bedroom - see Table 8 Sixteen nights of reliability check data unuseable. If for example children increased the sensitivity of the recorder, it increased the possibility of recording extraneous noise such as dogs barking, cars passing, and other household noise. If the sensitivity was decreased

the recording of a waking was less likely.

The reliance on parents for reliability check data also presented problems for the investigator. Parents made diary recording, activated the Esterline Angus, and noted switch on information (time and date) on the chart recorder paper. Any errors by parents could therefore reduce the accuracy of reliability or diary data collection.

Consistent yet arbitrary criterion were unavoidable if event records were to be scored without knowledge of parent records, a requirement for the reliability assessment. The transcription from event recorder to numerical values using the calibrated ruler may have reduced some error due to subjective measurement. The subjective criterion of two minutes for each waking also caused problems. If parents intervened before the 2 minutes criterion waking or they were not as accurate as the machine - recording a waking for example at 2.00 a.m., instead of 2.23 a.m., this could decrease event-by-event agreement. The operation of the Esterline Angus by the investigator was not possible because of the large number of families in the study, and the constant invasion of privacy.

The functional relationship between parent and child behavior for the maintenance and treatment of sleep disturbance has been noted in the literature by Richman (1985b) using fading, and by Willaims (1959; Wolf et al 1964) using extinction. After the postponement of treatment because of illness, and, the appropriate attention by parents,



a concomitant delay in the recovery of composite sleep scale scores, to the level before the illness, is shown. This relationship was readily apparent in this study by Jonathan, Peter, and Mathew in Experiment 1, by Gregg, Nicholas, Jonathan, and Lorie, in Experiment 2, and by Timothy, Eric, Scott, Kai, Ben, Dale and Christie in Experiment 3. These observations of a functional relationship due to parental attention at the times of illness further supports the behavioral view and the claim by Richman (1985b) that parents responses are extremely important in many waking behaviors.

The efficacy of behavioral treatments for sleep disturbance over medication, and psychotherapy has been shown by several outcome studies (Lawton 1985; Richman 1985b) and a larger study N = 193 by Seymour et al (1983b). Experiments 1 to 3 using multiple baseline designs investigated more closely the effects of behavioral treatments and if treatment gains could be maintained 18 months after treatment ceased. This study has shown a decline in sleep disturbance can be maintained by most children using strict treatment termination criterion of 3 weeks of no wakings. And that a functional relationship between parents and child responses maybe responsible for the development and maintenance of sleep disturbance. This relationship was demonstrated during parental attention at times of illness, and, when conditioned reinforcement, administered by parents, for sleep disturbance was removed, the severity of sleep disturbance behaviors was reduced across six outcome measures.

Future research might concentrate on comparison of behavioral treatments such as fading, extinction, extinction plus reinforcement, reinforcement alone then extinction plus reinforcement, and positive bedtime routines to determine the degree of treatment gains that are maintained in the long-term.

### CONCLUSIONS

The use of extinction, extinction plus reinforcement, and reinforcement procedures described in Experiments 1 - 3 suggest effective and clinically significant improvement for sleep disturbance in infant and preschool children can be achieved. Learning theory and the Coercive Behavior model may offer researchers a theoretical basis for determining the development and maintenance of sleep disturbance behaviors.

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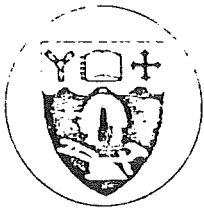
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APPENDIX A

Advertisement for subjects



Do you want help with a preschooler who: ( is between 2-5 years )

- *WAKES DURING THE NIGHT?*

- *TAKES A LONG TIME TO SETTLE ONCE IN BED?*

Are you prepared to spend some time recording your child's sleep pattern in order to ensure the most appropriate management strategy, measure its outcome and provide important information for a study being conducted into these worrying preschooler behavior problems?

If so Kevin Moesbergen, a Researcher in the Psychology Department of the University of Canterbury would like to meet you.

Over the next few months he is conducting a study which aims to find more information about sleep disturbance in preschoolers and ways of managing it.

Parents taking part in the study will be asked to attend the University for an initial interview, carry out management instructions carefully and to record their child's sleep pattern throughout the study. They will report back to the psychologist regularly by telephone or visit. Each family will be involved for approximately three months with some follow-up afterwards. In return we shall provide the family with as much help in managing the sleep problems as possible.

Because it is important for research purposes that each family receive the same amount of information we would appreciate restraint in discussing the programme. Please direct queries straight to him.

He can be contacted at the Psychology Department, University of Canterbury, telephone 482-009, extension 8678, or leave a message with Mrs O'Brien, extension 8682.



APPENDIX B

- i Daily Diary Recording Sheet
- ii Sleep Programme Data Sheet: Information

Child's Name: \_\_\_\_\_ Week: \_\_\_\_\_ Condition: \_\_\_\_\_

Goal Bed-time \_\_\_\_\_

Date						
Day sleep - time down						
time awake						
where						

Nightsleep - where						
Actual bed-time						
Ideal bed-time						
Explain if necessary						
Time from in bed to silence						
Describe noise						
No. of times awake						
Approx. duration	1.					
What did you do						
	2.					
	3.					
	4.					
	5.					
	6.					
	7.					
Time Awake In Morning						

KEY =

SLEEP PROGRAMME

DATA SHEETS: INFORMATION

1. Record 1 day down each column.
2. Day Sleep record the time the child is placed down; the time he or she wakes for each of 1 or 2 sleeps. Also record if the child sleeps away from home or in the car.
3. Night Sleep
  - (a) Record if at home or out. State actual bed-time and the ideal bed-time for that night, explain if ideal time is later than goal time.
  - (b) Record the time the child takes from being placed in bed, to silence and describe the quality of the noise. i.e. chatting, singing, crying.  
Indicate code letters under "key".
  - (c) Record number of times awake, the duration and what you did for each. Indicate code word under "key".
4. Record the time the child wakes in the morning.

APPENDIX C

- i     Structured Interview Record
- ii    Assessment and History Plan

Grading

☐

EXT/REINF.

☐

Extinction

☐

SLEEP PROGRAMME

DR'S Info.

☐

Drug

☐

Structured Interview Format

Consent Form

☐

Family Surname:

Date of Initial Interview:

Address:

Telephone:

Date of referral:

Family doctor consulted Yes/No

Referral from:

Household Composition

Adults	Name	Age	Race	Occupation
--------	------	-----	------	------------

Children

Significant others - re child minding

Child having Sleep problem

date of birth

Actual Bedtime

Ideal Bedtime

" Settling time

" Settling time

" Getting up time

" Getting up time

Average night wakings over whole of sleep time

Daytime Sleep? Yes/No.

Actual times

\_\_\_\_\_ to \_\_\_\_\_

\_\_\_\_\_ to \_\_\_\_\_

Ideal times

\_\_\_\_\_ to \_\_\_\_\_

\_\_\_\_\_ to \_\_\_\_\_

Describe Nature of Sleeping Problem

---

Age at Onset

Continuous/Intermittent

---

Clear Precipitating Event

Yes/No

Describe

---

Describe Child's development thus far:

Pregnancy

Birth

Feeding

Activity

Crying

Sleeping pre 3 months

Medical history

---

Birth Order 1, 2, 3 or subsequent

Sleeps Alone / Not alone

Describe

---

Family Life Events over Child's Life

---

Other problems

Child: present/absent

Family: present/absent

Describe

---

3.

What is done now to handle the child's problem?

---

What has been done in the past?

---

Advice received from:

Dr	Plunket	Mother/in law	Friends	Other
Describe				

---

Is Medication used now

Yes/No

Describe

---

Has Medication been used in the past

Yes/No

Describe

---

ASSESSMENT AND ACTION PLAN IN HISTORY TAKING AND INDIVIDUAL PROGRAMMES

OBJECTIVES:

Research:            Either Experiment 1  
                         or  
                         Experiment 2.

Treatment:    (1) Reinforcement (tokens) plus, other (edible) reinforcer  
                         chosen by child.  
                         (2) Above plus extinction.

MEDICAL HISTORY:

Interview:

Drs: Contact or not, advice of Prescription? Anything.

Drugs tried?

ANY OTHER PROBLEMS:

Convulsions:

Enuresis:

Toilet training or trained?

Mental Retardation.

Bedroom used as punishment area / or sent as a punishment:

Parents / up and down in last few years.



BEDTIME ROUTINE:

TV and activity before bed: (use count down from present activity).

Recordings by Diary and Reliability for Research:

APPENDIX D

i Reward Programme Handout

ii Reward/Extinction Programme Handout

## REWARD SLEEP

### PROGRAMME

1. Putting the child to bed: At bedtime put .....  
in her/his cot/bed after the usual bedtime ritual.
2. When you should attend: If necessary to attend do so  
if the child needs the toilet, is ill or in some kind  
of difficulty etc.
3. Loss of rewards: If not necessary to attend:
  - (1) remind the child she/he will loose the stars and  
e.g., the raisins (the other reward selected by  
the child), in the morning, and to go to sleep.
  - (2) Upon the second attendance which is not necessary,  
remind the child she/he has lost the raisins in  
the morning and will not get a star if she/he does  
not go to sleep
  - (3) Upon the third unnecessary attendance, remind the  
child she/he will not now get a star and to go to  
sleep.
4. Ring anytime: Ring Kevin Moesbergen Phone 482-009,  
Extension 8678 or at home 34-177 if you have any  
queries or are in doubt about something.

## REWARD/EXTINCTION

### PROGRAMME

1. Putting the child to bed: At the goal bedtime put .....  
in her/his cot/bed after the usual bedtime ritual.
2. When and how to attend: Do not attend unless absolutely  
necessary. That is only if the child needs the toilet, is  
ill or is caught up in the bedclothes or such like. If  
necessary to attend, do so with minimum light (e.g., hall  
light on only) and remedy the situation in a business like  
manner, then leave immediately.
3. When to give rewards: If the child sleeps through the night  
or does not require attending to, she/he will be given a  
star (see award a star instructions) and the other reward,  
previously determined by the child.
4. Ring anytime: Ring Kevin Moesbergen Phone 482-009, Extension  
8678 or ring at home 34-177 if you have any queries or are in  
doubt about something.

APPENDIX E

Awarding Stars Handout

## AWARDING STARS

### HOW TO AWARD STARS ON THE STAR CHART:

1. MAKE THE STAR CHART ACCESSIBLE: Place the Star Chart in a place where it can easily be seen, (e.g, on the fridge).
2. USE PRAISE: When desired behaviours occur  *speak up and praise the correct behaviour*, letting the child know that you are pleased with his/her accomplishment.
3. INVOLVE THE CHILD: When marking up the stars on the chart,  *allow the child to put the stars on the chart himself*. At the same time praise his/her efforts.
4. INVOLVE OTHERS: Encourage other members of the family to remark on the child's progress on the chart.
5. EMPHASIZE POSITIVE ASPECTS: When totalling daily and weekly stars give praise and feedback,  *pointing out the nights slept through*. Emphasize the positive aspects of the child's behaviour.  *Avoid criticism or nagging* where the child has woken. If necessary state why stars have not been earned to ensure the child understands what she/he must do. Encourage future efforts by such statements as "You'll have another chance tomorrow night".
6. DON'T THREATEN USING THE CHART: If necessary, you may refer to awakenings when no star is put on the chart.
7. CONTINUE CHART DESPITE NIGHT WAKINGS: Deal with night awaking as agreed but do not allow it to interrupt progress on the chart.
8. GIVING THE OTHER REWARD. Give the child the other reward ( e.g. Raisons ) only after a star is given. Do not give the other reward for behaviour, other than not waking behaviour.

APPENDIX F

Maintenance Programme Handout

SLEEP MAINTENANCE PROGRAMME

DATE:

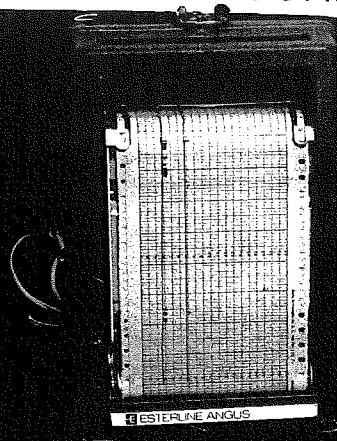
- Day 1      For every 2 stars give one reinforcer for the next 10 days.
- Day 11     For every 3 stars give one reinforcer for the next 15 days.
- Day 27     For every 4 stars give one reinforcer for the next 20 days.
- Day 48     For every 5 stars give one reinforcer for the next 25 days.
- Day 74     For every 6 stars give one reinforcer for the next 30 days.
- Day 105    For every 7 stars give one reinforcer for the next 35 days.



APPENDIX G

Esterline Angus, Voiced Activated Relay  
and Microphone, Reliability Probe

EVENT RECORDER



VOICE-ACTIVATED RELAY



MICROPHONE



APPENDIX H

- i Composite Sleep Scale Scores per Item
- ii Composite Sleep Scale Severity Scores

## S L E E P   S C A L E

1. MEAN SLEEP LATENCY, I.E. TIME DOWN TO BED TO TIME SILENT.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	POINTS.
2-15	16-30	31-45	46 OR MORE MINUTES.	

2. MEAN NUMBER OF NIGHTS AWAKE PER WEEK.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	POINTS.
1-2	3-4	5-6	7	NIGHTS AWAKE.

3. MEAN NUMBER OF WAKINGS PER NIGHT.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	POINTS.
1-2	3-4	5-6	7	WAKINGS PER NIGHT.

4. MEAN TOTAL HOURS SLEPT PER DAY.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	POINTS.
12-11	11-10	10-9	8 OR LESS HOURS.	

5. MEAN TIME AWAKE PER WAKING.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	POINTS.
2-7	8-20	21-40	41 OR MORE MINUTES PER WAKING.	

6. MEAN TIME SPENT IN PARENTS BED.

1 POINT --- PARENTS BED TO GET BACK TO SLEEP ONLY.

2 POINTS -- PARENTS BED ON SUBSEQUENT WAKINGS FOR THE NIGHT.

3 " " -- PARENTS BED ALL NIGHT.

4 " " -- PARENTS LAY DOWN WITH CHILD/ PARENT OUT OF BED, I.E.,  
SWAPS BED WITH CHILD FOR THE NIGHT.

## Composite Sleep Scale Severity Scores

18 - 24 = Acute Sleep Disturbance

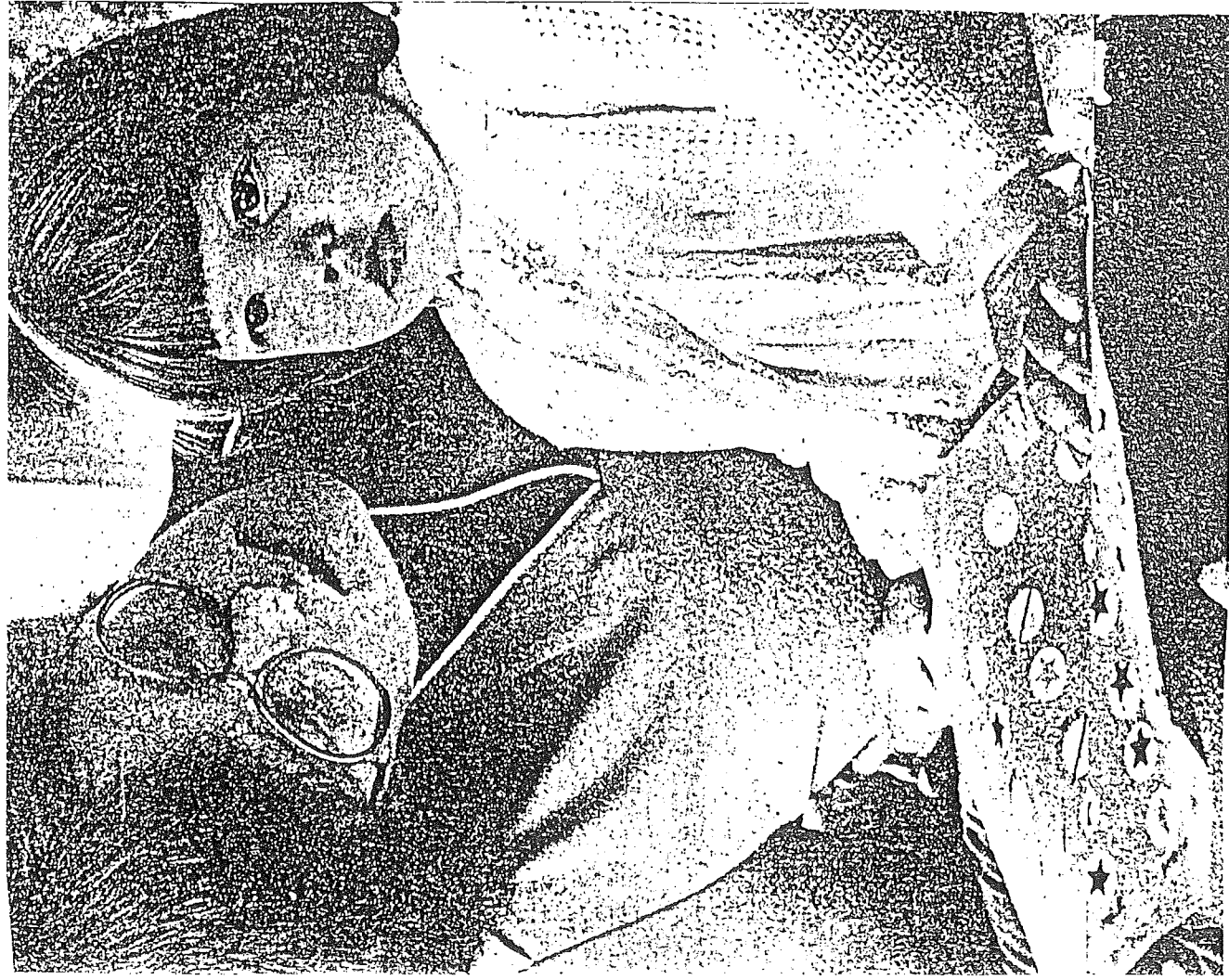
11 - 17 = Severe Sleep Disturbance

5 - 10 = Moderate Sleep Disturbance

0 - 4 = Slight Sleep Disturbance

APPENDIX I

Media Articles and Letters to the Editor



Mrs Clark and her daughter, Lorie, count their lucky stars. The stars are an incentive for Lorie to sleep through the night.

# Child's parents dream of a full night's sleep

An uninterrupted night's sleep is something that Murray and Jane Clark dream of.

They have not had one for two years. The cause is their daughter, Lorie, aged two years and three months, who has a chronic sleeping problem.

But the Lincoln couple's routine of waking several times each night to comfort their daughter seems to be over, thanks to a new research programme being run by the psychology department of the University of Canterbury. Lorie is one of about 30 children, aged two to five years, undergoing training to keep them asleep.

Coloured stars pasted on a chart is the simple incentive used. Lorie gets a star for each night that her parents do not have to physically comfort her when she wakes up.

After one month of the three-month programme she has notched up 12 stars in a row. "That to me was absolute bliss," her mother said.

Mrs Clark said the longest sleep she had had in the last two years was about four hours before getting up to cuddle or breastfeed her daughter. Exhaustion had left her depressed and she

would start crying for no real reason. Sometimes she feared that she would take out her resentment on Lorie and their other child, Jeffrey, aged four.

The Clarks had taken Lorie to the doctor several times and eventually he prescribed a powerful drug usually given to violently disturbed children.

"It made her absolutely whacked all day as well as at night," she said. "We decided there had to be some other way to get her to sleep."

They were getting desperate when Mrs Clark saw a notice about the university programme at the local play centre.

For several weeks they kept a record of the child's waking periods — up to nine times a night. Then the family was interviewed by the university student running the programme, Mr Kevin Moesbergen, who

worked out the routine that the Clarks follow.

They are amazed at the results. Now when Lorie wakes up, she often goes back to sleep of her own accord without crying to wake her parents.

Mr Moesbergen started the research towards his master's degree about six months ago, under the supervision of a senior psychology lecturer, Dr Nirbhay Singh. Before then he helped in a similar programme dealing with younger infants.

Mr Moesbergen said most parents who started his programme were thankful someone had at last taken an interest.

"They are very tired," he said. "There are arguments between them, sometimes marriage break-ups."

Sleepless children were a prevalent problem that could seriously affect whole families.

A Christchurch study of parents two years ago showed that up to 35 per cent of the 1000 children involved had had sleeping problems. Another British study said that 8 per cent of people in the same situation were open to child abuse.

The problem often starts because parents were always picking up a child to comfort it.

"It may be appropriate to pick up the child and cuddle it at 2 p.m. but the child really has to learn that a.m. is not the most appropriate time," he said.

Hence the reward system which ended when the child managed to sleep three weeks without waking. Mr

Moesbergen said many parents tried the same idea without success but worked under controlled conditions, where they had regular support and a programme from which to gauge results.

# Playing the mind game

by Bruce Gooding

Can psychologists listen? Can psychologists listen to psychologists who disagree with them?

**I**F YOUR BABY persistently wakes and cries through the night, John Kirkland is one of the people you might ask for help. The Palmerston North psychologist works at the CrySOS clinic for crying babies in his home city. That same city has been hosting a conference of psychologists, and Kirkland is in full flight outlining the various remedies available to parents who are plagued by their babies' sleepless nights.

He is interrupted: "Excuse me. Why do you label the behavioural approach as 'Let 'em cry'?"

Kirkland responds: "I believe it is accurate to call that option 'Let 'em cry'..."

The questioner doesn't think so: "I would say the behaviouralists invariably use reinforcement, a reward for non-crying behaviour, as well as extinction."

Extinction may sound a desperate solution to the problems created by a crying baby. However, in psychological jargon, "extinction" simply means taking no action and letting the baby cry till it stops. So this is no life-or-death matter. However, a real struggle is taking place here.

Some 300 psychologists have gathered for this conference. What happens in the next five days shows there are more players in this mind game than the behaviouralists, who think abnormal behaviour can be modified with "appropriate reinforcement", and the family therapists, who hold that because most of us are dependent on our families, then the family — not just the individual — must be treated.

There are, for example, the psychoanalysts, Freudians among them, and a group rapidly gaining popularity — the holistic counsellors, who probe the makeup of the whole person, including his or her diet. Division in the ranks was evident at the conference — heightened by the organisers' tendency to divide the

conference into sessions on the score of ideology as much as illness.

Many psychologists widened the splits by attending only those sessions that concurred with their particular line. One holistic counsellor, asked naively if he had enjoyed the behavioural papers on the first day, laughed uproariously: "You wouldn't drag me in there, mate." After a family therapy seminar, a brace of behaviouralists who had strayed into the opposition camp seemed most unhappy. "F\*\*\*ing family therapists," said one, "I just get so pissed off that there's no outcome data presented with all the religiosity."

Most of the 300 psychologists here will never offer their advice to the community at large. More than three-quarters of them work in schools, prisons or psychiatric institutions or are academics in universities. But during the five days they will be presented with at least 130 papers. Subjects include child abuse, unemployment, industry training, glue sniffing and even video games. But back to crying babies...

The behaviouralists have their answer. You can solve the crying baby problem. Canterbury University's Kevin Moesbergen reported results from a New Zealand trial of "extinction plus reinforcement". He says that in one trial the sleeping problems of all 22 children were solved when they were left to cry and rewarded with stars on charts for those nights that they did sleep through. The success rate for a further 22 children given reinforcement alone was 82 per cent.

But if family therapy advocates were at that session, none asked Moesbergen if he had monitored the children to see if other behavioural problems had emerged as a result of leaving them to cry.

And if the behaviouralists attended the Kirkland session there was only that lone interjector. Other theories about crying



## Getting children to sleep

Sir,—My personal growth through mothering three children has involved changes in expectations. In helpless despair we allowed our first child (at about 18 months) to cry-it-out when we failed to get him to sleep. Our expectations were in transition with our second child and at times I resisted her need of my closeness only to arrive yet again at the acceptance of her need. Our expectations totally revised, it has seemed so easy to follow our third child's cues and meet her needs. She sleeps in our enlarged bed when she indicates a readiness for sleep. When she wakes she usually breast-feeds back to sleep. There are numerous variations on the "family bed." My husband has a separate bed. Initially I found this enormously threatening, until we realised its possibilities as our "love nest" from which I can return to sleep with our child or children.—Yours, etc.,

C. GRIFFITHS.

June 2, 1984.

Sir,—The crucial issue in the "getting children to sleep" controversy (June 1.) is one of children's dependency needs and emotional development. Children are, by their state, not independent. Adults may achieve emotional maturity of which independence is one aspect. Most educationalists and psychologists generally define "infancy" as lasting until about the age of seven. Children deprived in infancy, in ways appropriate to them individually, have their growth towards independence halted or distorted. Conflict between being told "what is right" and what parents "feel to be right" is usually unresolved. Invariably it is the children who pay the price and the cycle of emotional deprivation continues for another generation. I sympathise with parents struggling to recognise and meet children's dependency needs. I am still struggling with mine. However in breaking the cultural conditioning, interfering with my biologically-based instinct to "mother" my children, I feel I am at least progressing.—Yours, etc.,

CHRISTINE D. ROWLANDS.

June 1, 1984.

## Getting children to sleep

Sir,—In answer to Rose Isdale and Catherine Glue on the problem of "getting children to sleep" and its surrounding issues: I do know 24-hour mothers who share their beds with their children. The children of such mothers are introverted, slow to talk, unable to interact properly with their peers, and insecure. The same terms could be applicable to their mothers. By contrast, those mothers whose children sleep in their own beds and who share the

parenting with the father, other relatives and child-care centres, are independent, vocal, secure and interact well with their peers. As to the enrichment of a marriage that a child can bring, I most certainly agree—but not to the extent that the mother denies her own needs and rights as a human being. Surely mothering, not smothering, is of most benefit.—Yours, etc.,

SHARON E. HUNTER.

June 14, 1984.

Sir,—I agree with Catherine Glue's approach to raising children. It is good to see such issues discussed in the open instead of just between guilty mothers whose children do not conform to the norm. I found La Leche gave me a lot of support adjusting to the constant demands and enormous responsibility of raising a child. I contacted La Leche when my first child was six weeks old and I was having problems with her not sleeping and having colic. La Leche's support gave me the confidence in myself to trust my own instincts in wanting to pick up my baby every time she cried, my desire to comfort her with my presence when she was in pain, and later to bring her into our bed so we both got more sleep. Now four years old, our daughter sleeps in her own bed. A child's will needs to be guided, not broken.—Yours, etc.,

H. M. GLASS.

June 13, 1984.

Sir,—Our seven-month-old daughter sleeps with us; it means not having to get out of bed to feed her, it means a gentle pat on her back as reassurance after a bad dream, it means she does not wake up lonely or afraid, it is the joy of her head popping up with a smile each morning and moving over for a cuddle. We do not expect, and would be very concerned, if ever she cried for any length of time in the night. It has helped forge a close bond among the three of us. I do not consider it a selfless duty, as all of us benefit.—Yours, etc.,

KAY IRVINE.

June 15, 1984.

Sir,—It is a personal thing whether or not a family bed is adopted; for us, it works. I am a mother of four children. I used to get up regularly through the night with our first two children, to be exhausted the next day. With our third child, I was again getting up, so we shifted his bed beside ours. All I did after that was reach out to comfort him or hold his hand. Although still waking, we had a good rest. Now, with our fourth child, we have her with us in our extended bed. We all sleep well. Their needs are being met and so are ours. They are growing up to be independent children. We have grown too, and our values are changing from things to people.—Yours, etc.,

JOSIE McINTOSH.

June 14, 1984.

Sir,—At last Catherine Glue and Christine Rowlands have been forced to admit that they have no evidence that where and how children sleep affects what kind of adults they become. As long as children's emotional and physical needs are met adequately during the day, parents need have no qualms about leaving their children to cry at night until they become accustomed to sleeping through the night in their own beds. Women, like myself, who are people first and mothers second, can carry on meeting their own needs as well as their children's without feeling they have to be on call 24 hours a day. I also have personal experience of families in which children commonly sleep with their parents.—Yours, etc.,

T. E. MOON.

June 15, 1984.

Sir,—T. E. Moon needs reminding that the subject under discussion is not the family bed. The issue is whether parents should meet their children's needs at the time and in

the way that best suits the children. Leaving a young child to cry herself to sleep is similar to telling a distressed teenager to cope alone with her problem (acne, painful menstruation, or whatever), except that the teenager, unlike the infant, does have other people she may be able to turn to. The family bed is not the only answer. The reason that so many advocate it is that it can make night-waking less stressful for parents as well as children. Parental exhaustion is not necessarily related to frequency of night-waking. Parents who enjoy their child's company six times a night may feel better rested than parents who worry about their child's wakefulness once a night.—Yours, etc.,

CATHERINE GLUE.

June 15, 1984.

## Getting children to sleep

Sir,—We have a child who slept badly from an early age. By six months she was waking six times a

night. Having her sleep with us had no effect on the number of times she woke. While we may have been "answering her every need" during the night, being chronically tired ourselves meant that we were unable to function adequately as parents during the day. There must be a balance between the child's needs and the parents', both parties' quality of life being important. To solve our problem we used the excellent sleep programme offered by the university. Our child still wakes briefly most nights, but has gained the independence to cope happily by herself, crying only when in genuine distress. We have energy now for her and the rest of our lives. She has happier days resulting from her healthier sleeping pattern and the added routine in our lives.—Yours, etc.,

M. B. MOSS and ALISON LOCKE.

June 4, 1984.

# Cry for help: Oh, for a good night's sleep!

"Jerry is a delightful child until bedtime, then the nightmare begins..." "Getting my child to sleep at night begins at 7 o'clock, and can take anything up to 10.30 or 11 o'clock, by which time I am utterly exhausted..."

"Waking up begins about 11 p.m. and continues through the night. If we leave her, she cries; bed, she wriggles and we don't get to sleep anyway..."

"I am so exhausted I can't cope with anything else. Household chores get left undone almost every day because she is grizzly from lack of sleep..."

"We have tried nearly everything — cot in our room, a bottle, a night light, even medication from the doctor — but nothing seems to work..."

If this sounds familiar, you are in good company. Research suggests that more than a quarter of all one to two-year-olds wake most nights.

Parents' reactions vary. To some, it is accepted as "just part of the reality of 24-hour parenting."

Some see the "family bed" as a time-honoured answer, used by many cultures.

But for others, it is a

severe problem. The endless succession of sleepless nights, and the lack of time to devote to their own needs, their partner, and the rest of the family, drives many parents to desperation. In some cases, it can lead to child abuse.

"Sleep problems in young children are common and they can be serious for all concerned," says Kathy Macdonald, author of "The Sleep Book."

"Many people find that things tend to get worse as time goes by. Parents tend to get more tired and run down, children get more difficult to manage, parents start to resent their children more, and interactions between parent and child tend to focus more and more on things that are wrong rather than on enjoying each other."

"It's like a snowball rolling downhill, gradually getting bigger and more out of control."

But her message is hopeful. "The good news about your child's sleep problem is that you don't have to put up with it. You can change it."

"The Sleep Book" was written in response to the deluge of enquiries received by the Auckland-based Leslie Centre, where Kathy Macdonald works, about the sleep plan the centre has developed.

The plan is reported to have helped more than 1000 families with children's night-waking problems.

"People who could not visit us personally were literally begging us for help," says Kathy Macdonald. "We were surprised by the extent of the need for advice."

"We mailed out detailed information on the sleep plan and six months later followed up with a questionnaire."

"Results showed parents could successfully put the

plan into practice themselves."

Kathy Macdonald says that while there are obvious advantages in a personal visit, using comprehensive and carefully prepared written material has also proved effective.

"That's why we decided to write the book. This way we can simply share our knowledge and hopefully ease a tremendous burden on many parents."

"Learning to sleep through the night is an important part of growing up, just like learning to walk, talk, and being toilet-trained," says Kathy Macdonald. "It is a whole new skill, which some children seem to learn automatically."

"Others need help, just as some children seem to toilet train themselves easily but others need lots of help and encouragement from their parents."

"Perhaps your child has never learned to sleep through the night or perhaps she or he has abandoned good sleep patterns after some disruption to the routine. Either way, the changes will be enormous when the child is settling happily at bedtime and sleeping through the night in his or her own bed."

Aside from affecting you to the point of desperation, children who cannot sleep

through the night may be over-active and difficult to manage during the day.

Children who learn to sleep well during the night have markedly improved behaviour, workers at the Leslie Centre found.

The sleep plan was originally developed and researched under the direction of Dr Fred Seymour, a psychologist at the centre.

"Too often in the past parents have gone to the family doctor and received medication to help their children sleep," he says. "We were most concerned about this disturbing trend."

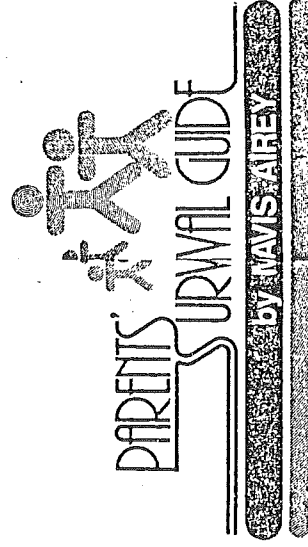
"A drug-free solution was needed, and we feel our plan provides just that."

The sleep plan is aimed at children aged between nine months and four years.

"A child's capacity for learning at an early age is incredible, and we have merely applied this principle to our programme."

"There's no reason infants as young as nine months shouldn't benefit from a plan which enables them to sleep," says Dr Seymour.

If you have any subjects you would like discussed in Parents' Survival Guide, please write to Mavis Airey, Home and People page, "The Press," P.O. Box 1005, Christchurch 1.



PARENTS' SURVIVAL GUIDE  
BY MAVIS AIREY

## Not just a matter of leaving your child to cry

The techniques used by the Leslie Centre are similar to those used by the University of Canterbury in its sleep management projects, according to Karyn France, a clinical psychologist who worked on projects as part of her Ph.D.

The technique uses a reward system where possible to change behaviour, but methods such as star charts are not appropriate for children under the age of two, she explains. "Rewards for sleeping through the night can't come until 12 hours later, and the child needs a certain level of language to understand a delayed reward."

The university programme also suggested that rewards on their own were not as effective as removing what reinforced the child's habit of crying: the expectation of getting parents' attention.

Karyn France is insistent that it is not just a matter of "leaving the child to cry," as if one were prescribing pills.

"The whole principle has to be explained carefully so that people really understand what happens using that technique — that be-

haviour gets worse before it gets better — and why children wake.

"Research in the United States shows babies have different sleep patterns from adults, and people need to understand this," she says.

"It is also necessary to understand contingency management: what to do if your child does this, that, or the other. If there is a partner, it is important for you both to work out what you are going to do."

"I think parents would need to read the book through from cover to cover, not just pull out the bit saying what to do."

The university projects are now in the final stages of writing up the data. But Karyn Field advises that if you need personal guidance on sleep problems you should approach the child and family guidance centre attached to your local hospital.

In Christchurch, she suggests organisations such as the Presbyterian Social Services' Campbell Centre can give information about helping agencies, and have a list of psychologists in private practice.

APPENDIX J

Thevenin's Extended Parental Bed



*If we could do it all over again, we would buy a king-size bed at the time of our marriage.*

*—Mother  
St. Paul, Minnesota*



*Daddy and his two little daughters.*

*—Prior Lake, Minnesota*

APPENDIX K

Health Department Correspondence

208./28./3



# DEPARTMENT OF HEALTH HEAD OFFICE

MACARTHY TRUST BUILDING, LAMBTON QUAY, WELLINGTON,  
NEW ZEALAND

P.O. BOX 5013  
TELEX NZ 3571  
TELEPHONE:  
727 627

22 May 1984

Mr K Moesbergen  
Psychology Department  
University of Canterbury  
CHRISTCHURCH

Dear Mr Moesbergen

Thank you for your letter of 4 May in which you request information on the use and health budget cost of certain antihistamine preparations for the treatment of sleep disturbances in infants and pre-schoolers.

We are able to help you in relation to the Health Department's budget for the three preparations you are interested in.

This division operates a survey of every two hundredth prescription item dispensed by retail pharmacists and passed for payment by the Department of Health. The analysis gives us a breakdown of pharmaceutical benefits expenditure by cost, number of prescriptions and number of capsules/tablets/millilitres etc that are prescribed.

The survey does not capture information on the basis of diagnosis, age, sex or location. We are therefore unable to help you in your request for figures on the use of Vallergeran, Phenergan and Benadryl in the treatment of sleep disorders.

We do not have figures on the imported volumes of the above medicines. I suggest that you write to the following manufacturers for this information:

May and Baker (NZ) Ltd P O Box 35060 Naenae WELLINGTON	-	manufacturer of Vallergeran, Vallergeran Forte and Phenergan preparations
Parke-Davis Pty Ltd CPO Box 4275 AUCKLAND	-	Manufacturer of Benadryl preparations

The following figures are from the "1 in 200" survey for the year ended 31 March 1983:

Medicine	Trade Name	Number of Prescriptions	Cost to the department	Number of millilitres
Diphenhydramine hydrochloride	Benadryl Elixir	3,100	7,100	528,900
Promethazine hydrochloride	Phenergan Elixir	53,700	121,700	5,825,700
Trimeprazine tartrate	Vallergan/ Vallergan Forte Elixir	25,800	74,700	2,986,500

Benadryl and Phenergan Elixirs are available over the counter from pharmacies and thus their use will be very much greater than that given above, especially in the case of Phenergan Elixir.

We do not know what proportion of the above costs relate to the use of these preparations in sleep disorders.

Yours sincerely



J S Phillips  
Director  
Division of Clinical Services



**DEPARTMENT OF HEALTH**  
**HEAD OFFICE**

MACARTHY TRUST BUILDING, LAMBTON QUAY, WELLINGTON,  
NEW ZEALAND

P.O. BOX 5013  
TELEX NZ 3571  
TELEPHONE:  
727 627

2 July 1985

Mr K Moesbergen  
Psychology Department  
University of Canterbury  
CHRISTCHURCH 1

Dear Mr Moesbergen

In reply to your letter of 11 June requesting an update on figures from the divisions "1 in 200" Prescription Pricing Survey the following are available for the year ended 31 March 1984:

Preparation	Trade Name	Number of Prescriptions	Cost to the Department	Number of Millilitres
			\$	
Diphenhydramine hydrochloride	Benadryl Elixir	2,200	6,100	626,000
Promethazine hydrochloride	Phenergan Elixir	46,800	114,100	5,410,300
Trimeprazine tartrate	Vallergan/ Vallergan Forte Elixir	17,700	55,200	2,167,900

Although complete figures for the year ended 31 March 1985 are not yet available figures for the first period, April to July 1984 are as follows:

Preparation	Number of Prescriptions	Cost to the Department	Number of Millilitres
		\$	
Diphenhydramine	2,000	5,000	306,400
Promethazine	15,100	38,100	1,721,900
Trimeprazine	6,600	20,600	800,700

It is expected that the prescription use of promethazine and to a lesser extent diphenhydramine is much greater than indicated by the "1 in 200" figures because these medicines tend to be



used in combination with other agents such as paracetamol and cough suppressants. Information on combinations of this nature is only available on a general basis and not attributed to the individual agents involved.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'J S Phillips', with a stylized, sweeping underline.

J S Phillips  
Director  
Division of Clinical Services

Address all communications to  
The Director-General of Health.  
Telegraphic Address:  
Health, Wellington.

Reply reference

208/28/3



# DEPARTMENT OF HEALTH

## HEAD OFFICE

MACARTHY TRUST BUILDING, LAMBTON QUAY, WELLINGTON,  
NEW ZEALAND.

P.O. BOX 5013  
TELEX NZ 3571  
TELEPHONE:  
727 627

2 September 1986

Mr K Maesbergen  
Psychology Department  
University of Canterbury  
CHRISTCHURCH 1

Dear Mr Maesbergen

Below is an update on the figures from the 1 in 200 survey showing the use of Benadryl elixir, Phenergan elixir, and Vallergran and Vallergran forte elixirs:

For the year ended: 31 MARCH 1985				31 MARCH 1986		
	No.of Prescrips.	Cost to Dept \$	Millilitres	No.of Prescrips.	Cost to Dept \$	Millilitres
Diphenhydramine H Cl (Benadryl Elixir)	4200	10800	702700	6000	17000	1469100
Promethazine H Cl (Phenergan Elixir)	46800	129500	5656900	63200	200100	7905400
Trimeprazine Tart. (Vallergran/Vallergran forte Elixir)	18800	57000	2159100	21600	75700	2764900

Dr Phillips' comments on the use of promethazine and diphenhydramine in combination with other agents, in his letter of 2 July 1985, are still relevant.

Yours sincerely

G. R. Boyd  
for Director-General of Health